A Database Publication

THE MICRO USER

Volume 7
Number 4
June 1989
£1.50

Top-selling guide to the BBC Micro, Master, Archimedes and Z88

GENETICS

Simulate evolution: A graphical display

BODY BUILDING

Bop along with the WholeBody Joystick

DEBUGGING

Find out where your programs waste time

GAME

Five Alive: Type-in arcade adventure

GRAPHICS

An Archimedes-style demo on a BBC Micro

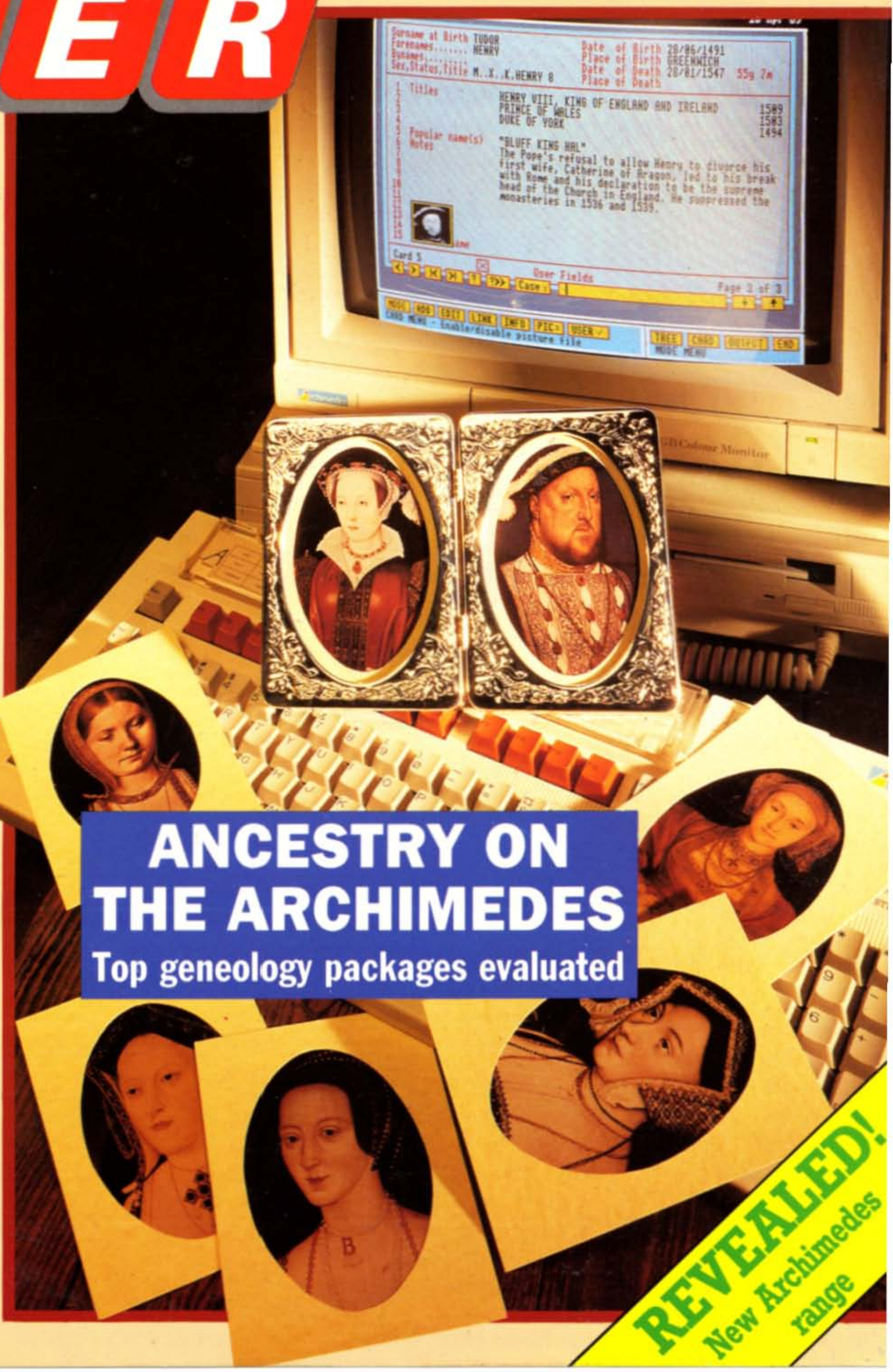
Z88

The most common questions answered

REVIEWS

- Art Nouveau
- Think Ahead
- Render Bender
- Stock Pack
- Martello Tower
- Risc Forth
- Home Accounts
- Puff
- Wizard Strikes Back

. . . plus all the latest games

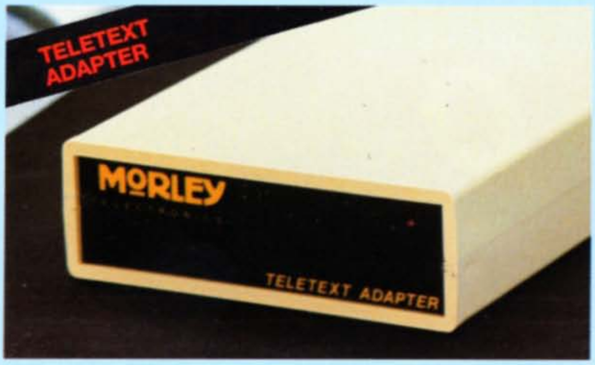

Surname at Birth TUDOR
Forenames....... HENRY
Sex,Status,Title M..X..K.HENRY 8
Date of Birth 28/06/1491
Place of Birth GREENWICH
Date of Death 28/01/1547 55y 7m
Place of Death
Titles
HENRY VIII, KING OF ENGLAND AND IRELAND 1509
PRINCE OF WALES 1503
DUKE OF YORK 1494
Popular name(s)
Notes
"BLUFF KING HAL"
The Pope's refusal to allow Henry to divorce his first wife, Catherine of Aragon, led to his break with Rome and his declaration to be the supreme head of the Church in England. He suppressed the monasteries in 1536 and 1539.
Card 5
User Fields
Case
Page 3 of 3
CARD MENU - Enable/disable picture file
ADD
EDIT
LINK
INFO
PIC
USER
TREE
CARD
OUTPUT
END
MODE MENU

ANCESTRY ON THE ARCHIMEDES

Top geneology packages evaluated

REVEALED! New Archimedes range

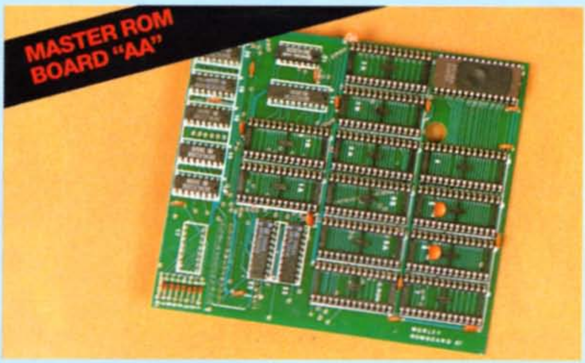
MORLEY E·L·E·C·T·R·O·N·I·C·S



TURN YOUR BBC INTO A TELETEXT RECEIVER

- ☐ State-of-the-art unit.
- ☐ ATS (Advanced Teletext Software) supplied on ROM.
- ☐ Free Telesoftware. Download and use high quality software.
- ☐ Free use of automatically updated massive database.
- ☐ Digital tuning – no manual controls.
- ☐ Comprehensive user guide.
- ☐ Allows standard Teletext pages to be saved and printed.
- ☐ World's biggest selling adapter.

BBC/Master	**£104**
Compact	**£120**
RML Nimbus	**£104.20**
Optional PSU	**£9.50**



THE ULTIMATE ADD-ON FOR ALL SERIOUS MASTER USERS

- ☐ No more need to switch your computer off to insert a cartridge containing a required ROM.
- ☐ With 2 cartridges and a ROM board, a staggering 32 ROM images installed and accessible at any time.
- ☐ Allows up to an additional 8x16k and 4x32k ROMS installed inside your computer still leaving your cartridge slots free.
- ☐ Master control ROM which includes a clever file transfer program allowing files to be transferred between DFS and ADFS formats or vice versa.

£40

EPROM PROGRAMMER "V2"
MORLEY
PROGRAMMER V2

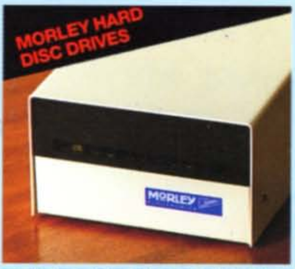
- ☐ Attractive state-of-the-art unit.
- ☐ Totally software controlled. Eprom creator utility also available.
- ☐ Programmes 27128/2764/27256 Eproms: 12 and 21 volt.
- ☐ Includes full ROM management software with numerous features.

£30

MASTER SMART CARTRIDGE
SMART CARTRIDGE
WARNING
Please insure that this label faces the back of your Master Computer.
MORLEY
ELECTRONICS

- ☐ Fast to install and operate.
- ☐ User-friendly menu driven software.
- ☐ Built-in features include:
  - Autosaves computer's entire memory.
  - Freeze program at any point.
  - Screen dump (any mode) to printer or disc.
  - Allows most protected software to be backed up including disc to tape and tape to disc.
  - Extensive range of useful FX calls.

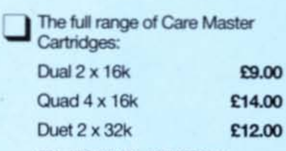
£30



THE BEST DISC DRIVES AT AFFORDABLE PRICES

- ☐ Completely compatible with BBCs, B+s and Masters fitted with ADFS.
- ☐ High output switched mode power supply.
- ☐ Free utility disc incl. Format; Verify; Archive and Park.
- ☐ Whisper quiet internal fan.

20meg £370 30meg £420 40meg £500



☐ The full range of Care Master Cartridges:

Dual 2 x 16k	£9.00
Quad 4 x 16k	£14.00
Duet 2 x 32k	£12.00
32k NON VOLATILE RAM Cartridge (ideal for Spellmaster Dictionary)	£33

SOFTWARE ... SOFTWARE ... SOFTWARE ...

M/B SOFTWARE

☐ DESIGN 7+. Commonly accpted as the brand leader in Teletext screen programs	£8.60
☐ DESFAX. Design and run your own Teletext information/display system	£17.40
☐ MASTERFAX. Enhanced Desfax program on the Master or compact	£26.00
☐ MASTERCOPY. A must for any Master or Compact owner. Allows simple, intelligent file transfer between ADFS and DFS systems. You'll wonder how you managed without it	£11.20

MORLEY SOFTWARE

☐ Teletext utility disc. Includes auto downloader, screendump, etc.	£5.20
☐ Eprom utility disc. Put all your favourite routines into sideways ROM, both basic and machine code	£5.20

COMPUTER CONCEPTS

☐ Spellmaster	£51.30
☐ Mega 3	£85.00
☐ Interword	£49.00
☐ Interbase	£60.00
☐ Intersheet	£49.00

Plus full range.

CONSUMABLES

☐ 27128 Blank Eproms	£4.20
☐ 5¼ Floppy Discs x 10	£5.00
☐ 3½ Floppy Discs ··	£10.00

ALSO AVAILABLE A full range of Amstrad/IBM peripherals. Telephone for details.

COMING SOON...

Master Speech Cartridge

TO ORDER...

CARRIAGE: £1 on all orders. £3 on larger items (adapters).

VAT: UK customers please add 15% to cost incl. carriage.

BY POST: Enclose cheque made payable to MORLEY ELECTRONICS LTD.

BY PHONE: By quoting your ACCESS or VISA card number.

Goods usually despatched by return.

Government and Education orders welcome.

Morley House, Off Norham Road, North Shields, Tyne & Wear NE29 7TY. Tel: (091) 257 6355. Fax: (091) 257 6373

Jet Fighter
£14.95

Sales Ledger
£64.95

Atelier
£99.95

Purchase Ledger
£64.95

Hoverbod
£14.95

System Delta &
Card Index (BBC) £64.95

Minotaur
£14.95

Home Accounts
£49.95

Orion
£14.95

System Gamma (BBC)
£49.95

Reporter
£39.95

Stock Management
£64.95

Missile Control
£14.95

Order Processing/
Invoicing £64.95

Mailshot
£39.95

Thundermonk
£14.95

SigmaSheet
£69.95

LWT Customisation
p.o.a.

GammaPlot
£69.95

Hotelier (BBC)
£69.95

Nominal Ledger
£64.95

Need we say more?

Ancestry
£79.95

Freddy's Folly
£14.95

Ibix, The Viking
£19.95

Stock Management
(BBC) £45.95

Timetabler
£688.85

System Delta Plus (V.2)
£79.95

School Administrator
£149.95

Nominal Ledger (BBC)
£55.95

Archimedes software except where indicated. All prices are inclusive of VAT.

MINERVA

69A SIDWELL STREET, EXETER, EX4 6PH. TEL. (0392)437756
FAX. (0392) 421762

THE MICRO USER

Managing Editor
Derek Meakin

Group Editor
Alan McLachlan

Features Editor
Peter Davidson

Production Editor
Peter Glover

Deputy Features Editor
Steve Turnbull

News Editor
Don Lewis

Technical Editor
Mike Cook

Promotions Editor
Christopher Payne

Promotions Coordinator
Robin Nixon

Reviews Coordinator
Pam Turnbull

Advertisement Manager
John Snowden

Advertising Sales
Peter Babbage, Gail Blincow

Tel: 0625 878888 (All depts.)
051-357 2961 (Subs.)
Telecom Gold: 72:MAG001
Telex: 9312188888 DB
Prestel Mailbox: 614568383
Fax: 0625 879966

Published by:
Database Publications Ltd,
Europa House, Adlington Park,
Adlington, Macclesfield SK10 4NP.

Subscription rates for
12 issues, post free:

£15 – UK
£25 – Europe (incl. Eire)
£31 – Overseas Surface
£42 – Overseas Air

ABC 59,727
Jan-June 1986
ISSN 0265-4040

The Micro User welcomes program listings and articles for publication. Material should be typed or computer-printed, and preferably double-spaced. Program listings should be accompanied by cassette tape or disc. Please enclose a stamped, self-addressed envelope, otherwise the return of material cannot be guaranteed. Contributions accepted for publication will be on an all-rights basis.

© 1989 Database Publications Ltd. No material may be reproduced in whole or in part without written permission. While every care is taken, the publishers cannot be held legally responsible for any errors in articles, listings or advertisements.

The Micro User is an independent publication and neither the BBC nor Acorn Computers Ltd are responsible for any of the articles in this issue or for any of the opinions expressed.

News trade distribution: Diamond Europress Sales & Distribution, Unit 1, Burgess Road, Ivyhouse Lane, Hastings, East Sussex TN35 4NR. Tel: 0424 430422.

Database Publications is a division of Europress Ltd

Features

7 News
All the latest events in the ever-changing world of your BBC Micro.

24 Mad Hatter
A regular monthly look at adventure games – old, new and revamped.

36 Hac Man
A wealth of useful hints and news from our resident games expert.

43 Problem Solved
A helping hand with some of those mind-testing hardware problems.

53 Making Movies ✱
Continuing our series we look into various ways to animate the sprite.

61 Evolution ✱
We present a superb simulation of the fascinating world of genetics.

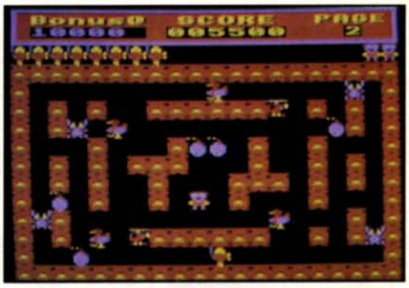
82 Wimps
How to utilise the windowing tools in our DIY accounting program.

106 Body Building ✱
Mike Cook presents his amazing full-body joystick for you to enjoy.

111 Ceefax Guide
What's coming this month on the telesoftware pages of BBC TV.

129 Letters
The chance to get your news, views, moans and name into print.

Game



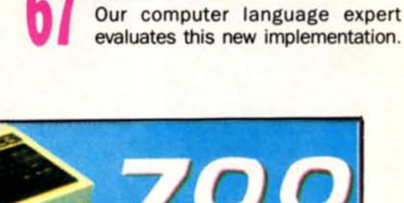
89 Five Alive ✱
A sparkling arcade adventure to have you coming back for more.

Reviews

20 Geneology
Looking up your own family tree: We compare two market leaders.

31 Software Scene
Our reviewers cast their eyes over the very latest games releases.

39 Art Nouveau
We put a brand new Archimedes 256 colour art package to the test.



67 Risc Forth
Our computer language expert evaluates this new implementation.

57 Simple Answers
Our expert team presents practical solutions to some of the most frequently asked questions about this portable micro.

112 Render Bender
Stunning 3D graphics displays at your fingertips? We check it out.

115 Home Accounts
The last excuse not to use your micro for personal finance is gone.

Utilities

27 Timer Debug ✱
Analyse which part of your program is occupying the most time.

47 Looking Good ✱
Now BBC Micro graphics displays can be as good as the Archimedes.

49 Eliminate ✱
An amazing utility to help you to find every anagram of long words.

Education

69 Update
Up-to-the-minute news of the BBC Micro in the world of education.

73 Education Reviews
Looking at the best in software for the BBC Micro series in schools.

79 Table Expert ✱
Train up on your multiplication using this high quality program.

Cover story

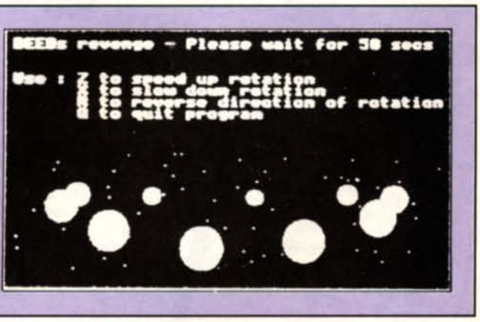
Looking into your family history can be a fascinating pastime. We compare two of the software packages currently available so you can choose the one that fits your needs. See Page 20.

Tracing the rays

The new breed of software for the Archimedes is here. Now you can produce some stunningly realistic moving displays quickly and easily – check out our review on Page 112.

MICRO MIMIC

Everybody knows the Archimedes is better than the 8 bit BBC Micro – or is it? On Page 47 we bring you a program that reproduces on the original BBC Micro a graphics demo first seen on the Archimedes.



```
BEEBs revenge - Please wait for 58 secs

Use : Z to speed up rotation
      X to slow down rotation
      R to reverse direction of rotation
      Q to quit program
```

MICRO USER CLASSIFIEDS

The best bargains in the world of the BBC Micro come from fellow readers of *The Micro User*. Turn to ***Page 120*** to find just what you're looking for – from cheap modems to complete computer systems.

✓ **For full details of how to use the Checksums, see the article on Page 48 of the February 1989 issue of *The Micro User*.**

✱ **The Type-it-in symbol indicates that the feature contains at least one full length listing for you to key in on your micro.**

NEXT MONTH

DISPLAYS
Classic 3D solids

FRACTALS
Unique definition language

EDUCATION
Pro-Artisan for teaching

BOB AND TREV
Old favourite returns

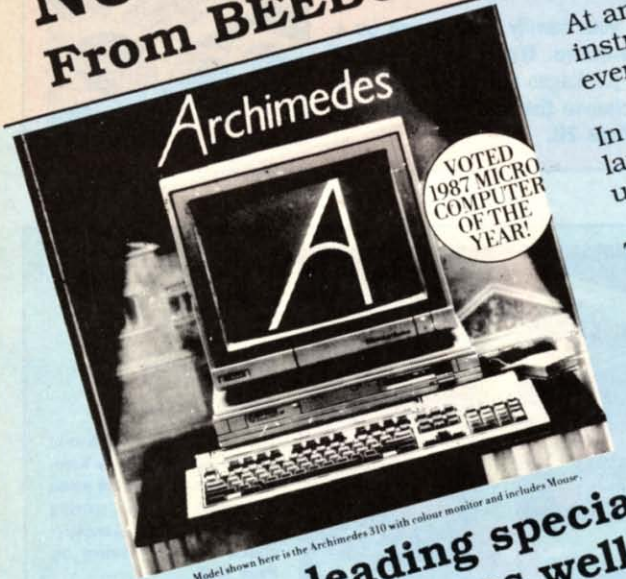
THE MICRO USER

July issue on sale June 3

Archimedes

The World's Fastest Micro Now Available on 0% Finance

From BEEBUG - The Archimedes Specialists


Archimedes
VOTED 1987 MICRO COMPUTER OF THE YEAR!

Model shown here is the Archimedes 310 with colour monitor and includes Mouse.

At an operating speed of 4 million instructions per second, just about everything you do happens instantly.

In addition to BBC Basic, high level languages such as 'C' and 'Pascal' can be used for specialist applications.

The 310M is supplied with the PC Emulator which will run over 90% of MS-DOS software including LOTUS 123, D-Base III, MS-WORD etc.

With 0% finance repayments for a 310 Colour System at only £128 per month.

BEEBUG the leading specialist Archimedes dealer offer the best deals as well as comprehensive support for you and your computer.

RISC USER

Subscribe to Risc User (£14.50), the Archimedes magazine, when you purchase your Archimedes and we will supply absolutely free; Artisan, 10 discs, lockable disc box and printer lead.

0% FINANCE

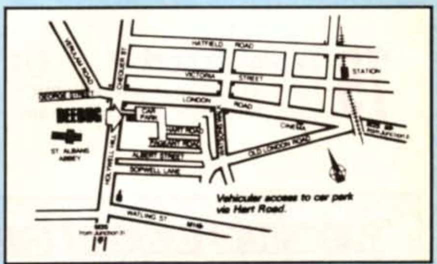
Now over 9 months. Please phone for an application form. Return it with the deposit and we will be able to despatch your machine within 48 hours of receipt.

	Cost	Deposit		Cost	Deposit
310	1033.85	106.85	410/1	1378.85	145.85
310 Mono	1102.85	112.85	410/1 Colour	1631.85	164.85
310 Colour	1286.85	134.85	420/1	1853.85	198.85
310M	1102.85	112.85	420/1 Colour	2208.85	226.85
310M Mono	1171.85	118.85	440	2908.35	298.35
310M Colour	1355.85	140.85	440 Colour	3161.35	317.35

12, 24 or 36 Months Credit and Trade ins

Should you prefer, we are also able to offer credit over 24 or 36 months at 13.75% flat rate (typical APR 27.5%). We are also able to offer up to £225 for your old BBC computer. Please ask for written details.

Acorn
The choice of experience.


HATFIELD ROAD
VICTORIA STREET
LONDON ROAD
STATION
CINEMA
OLD LONDON ROAD
CHEQUER ST
VERULAM ROAD
GEORGE STREET
BEEBUG
CAR PARK
HART ROAD
ST ALBANS ABBEY
HOLYWELL HILL
ALBERT STREET
SOPWELL LANE
WATLING ST
Vehicular access to car park via Hart Road.

To find out more phone or write now.

Beebug Ltd, Dolphin Place, Holywell Hill, St.Albans, Herts AL1 1EX

We offer a complete service, including Advice, Technical Support, Showroom, Mail Order and Repairs. Our showroom in St.Albans stocks everything available for the Archimedes.

Opposite Clarks Camera Shop on Holywell Hill

OPEN

9 am - 5.30 pm Mon - Sat

Thursday open late 'til 8pm

0727 40303

NEWS beat

Affordable Archie IS on the way

ACORN has finally admitted that a low cost Archimedes is on the way. It will be positioned between the Archimedes 300 and 400 series.

While the company remains tight lipped, trade sources have confirmed that the machine is about to be launched.

Rumours about an "affordable Archie" have been growing, but the first admission that the new machine exists came in a recent press release on other new Acorn products: "The company has stated that it will be unveiling a further new machine in May, positioned between the Archimedes 300 and 400 series", said the release.

Dealers and distributors have been preparing their advertising campaign for the new Archimedes, which is seen as a strong bid by Acorn to further secure its position in the education market.

The absence of official company comment has left details sketchy.

It is understood that the new machine is a Risc based trimmed down version of the existing Archimedes with internal disc drive and with a standard 1Mb ram upgradeable to 2Mb.

General feeling is that it could sell for around £650 but some sources have quoted prices as low as £499.

This could put it in the same price bracket as the Master series and make it a serious option for BBC Micro owners wanting to upgrade.

It could also pose a threat to the Atari ST and Amiga in the education field, especially as, in line with Acorn policy, the new machine will support Econet.

Acorn upgrades its 400 series

ACORN has announced three new models in its Archimedes 400 series of Risc-based workstations that offer a 10 per cent increase in processing speed and a full upgrade path across the range.

The 10 per cent improvement in speed has been achieved by increasing memory cycle efficiency.

New 400 series hardware is configured to allow users to add easily-fitted upgrade options from Acorn and third parties. For data intensive applications up to four Mb of ram can be accommodated all fully addressable by the operating system in native mode.

This goes well beyond the inherent 640k limitation of MS DOS on PCs and the new machines are all 100 per cent compatible with existing tested Archimedes packages.

Standard hardware features throughout the 400 series include built-in graphics controllers for a range of mono and colour monitors, hard disc controller circuitry, four-slot expansion backplane with fan and a co-processor bus. A floating point processor card and a SCSI card for adding external peripherals including hard disc storage will soon be available.

The Archimedes 410 base model of the new 400 series has full 1Mb of ram free for applications and data. Risc OS is held in the 0.5 Mb of rom.

A 3.5 inch disc drive accommodating 800k discs obviates the need for excessive disc swapping, while the integrated hard disc controller with its well-established fast 1:1 interleaves allows for simple expansion.

With all the features of the 410, the Archimedes 420 has two additions as standard. These are an internal 20 Mb hard disc and two Mb of ram. This makes the 420 an ideal solution for memory intensive applications such as desktop publishing, complex spreadsheets and graphics production as well as providing for complete utilisation of MSdos with Acorn's PC emulator.

Top of the range is the new Archimedes 440 which features a fast-access 50Mb formatted hard disc. Combined with 4Mb of ram, the 440 provides the memory capacity for the most demanding professional application.

The Archimedes 400

An optional internally fitted Econet module can be added to all machines for connection to Acorn's low-cost networking system and Risc OS drivers for the Acorn Ethernet LAN card will be available shortly.

Other expansion cards include serial, parallel and IEEE communications, a Midi interface, 16 bit sampler, video digitiser and rom expansion.

Acorn's general sales manager Terry Sherwood said: 'We believe that the Archimedes 400 series now provides computer users with an unmatched combination – high performance Risc technology, hardware and software flexibility, powerful networking options and above all, the ability to upgrade the sytem as and when required".

The new 410 costs £1,378, the 420 is £1,953 and the 440, £2,873.

Master in A-check

THE BBC Master is playing a vital role in verifying a theory that could harness the power of the hydrogen bomb.

Professor Martin Fleischmann rocked the scientific community recently when he claimed that driving a current between two electrodes in heavy water created nuclear fusion.

His hypothesis is now being investigated by the Harwell Laboratories, and scientists there are using a Master to control the electric current being applied to the electrodes.

Nick Hance of Harwell told *The Micro User* it will be up to three months before the theory is either proved or disproved.

"Professor Fleischmann is one of Harwell's consultants, and we regard his work with high esteem", he said. "If his hypothesis is proved it could provide a very important source of cheap energy which would be more easily produced and would produce no nuclear waste at all.

"Our investigation of the theory needs precise monitoring of the electric current over long periods, and that is the job of the Master".

BEEBUG

Your Chance To Join The Team

In 1982 when Acorn announced the release of the BBC Micro, Beebug was formed to provide a magazine and user group for the new computer. Since then Beebug has continued to grow and provide new services.

We are shortly expanding into larger premises and therefore have some interesting staff vacancies.

Today, as well as publishing Beebug for users of the BBC Micro, Master and Compact, we publish RISC User, the leading magazine exclusively for Archimedes users. We also have a large showroom and Mail Order operation, supplying goods throughout the world all backed up by our Technical Support Department. Beebugsoft, our software division, provide an exciting range of products for the BBC, Master and Archimedes.

ENGINEER

Full Time & Freelance

A full time engineer is now needed to enable us to improve our repair and upgrade services. In addition to this, the successful applicant will be involved in the design and development of new hardware projects for the Archimedes, and subsequent new machines that Acorn will be releasing. We also require the services of freelance engineers to work on design and development projects from their own homes.

TECHNICAL SUPPORT ASSISTANT

Our Technical Support team provide answers and advice on an extremely wide range of subjects, covering both software and hardware on the BBC Micro, Master and Archimedes computers. We are looking for someone who owns a computer themselves and can demonstrate their enthusiasm on the subject. Training will be given, although a certain level of knowledge concerning existing products will be necessary along with the ability to express yourself clearly in writing and on the telephone. Experience on PC compatibles would also be a benefit.

If any of these positions are of interest and you would like to work in a friendly but demanding company, please apply in confidence giving full details of yourself and any relevant experience.

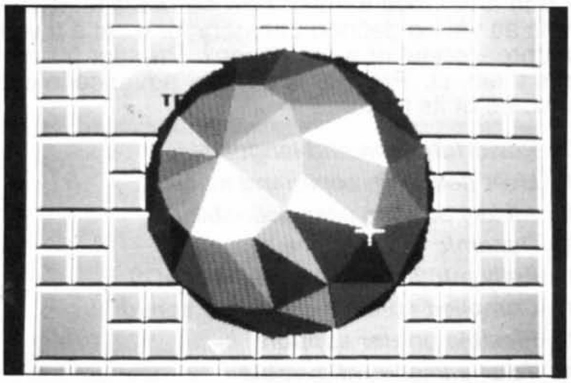
Personnel Manager,
Beebug Limited,
Dolphin Place, Holywell
Hill, St. Albans, Herts.
AL1 1EX

SOFTWARE PROJECT CO-ORDINATOR

This is a new and particularly interesting position for someone who has an eye for fine details. Reporting to the software manager, the successful applicant will have the opportunity to control new software projects for the Archimedes. This is not a programming position, but knowledge of Basic and Assembler is essential (and C preferable) together with familiarity of popular applications software. The ability to write clearly will also be necessary to produce program specifications and user documentation.

NEWS beat

Arcs really have the joint jumping



DISCO dancers will soon be bopping with 3D cartoon figures and electronic fireworks, thanks to a revolutionary new audio visual system developed on a BBC Micro but now teaming up two Archimedes.

The Bit Bopper from Tecnation (0235 848755) is an entertainment system designed for the disco and club market. It uses two Archimedes A440s with internal audio and video digitisers to produce music and hundreds of two and three dimensional video effects which would be impossible with conventional mechanical lighting.

"It will produce some really whacky video effects for discos", said Tecnation's Alex Blok. "As well as electronic fireworks, it has electronic oil wheels, psychedelic real time 3D panels, flight simulators and a library of hundreds of other 3D effects that are very very weird.

"We will be adding audiomation cartoon characters that will move to the music. The possibilities are endless. It really does show off the Archimedes – you couldn't do this with any other machine. One Archimedes controls the other, which is totally dedicated to throwing graphics around".

The system includes software that mimics conventional mechanical control panels and the graphics are based on Tecnation's high speed Genesis algorithms.

In addition to software controlled video outputs for connection to video projectors, Bit Bopper also includes two video input sockets allowing a mixture of both overlaid colour video and pseudo colour digital video effects. All effects can be pulsed to the music.

Using the internationally accepted Midi standard, the Bit Bopper's two micros not only communicate with each other but could be connected via suitable interfaces to conventional lighting and laser systems.

Due to be completed later this year, it will be aimed initially at the club entertainment market costing between £15,000 and £20,000 but it is hoped to follow up with a home version.

Watford's Stop Press

WATFORD Electronics has taken over the AMS range of BBC Micro products which includes Stop Press, Super Art and the AMX mouse.

Logitech has transferred this section of its AMS line to Watford so it can concentrate on assaulting the PC market.

General manager of Logitech Nick Pearson said: "Watford Electronics is a specialist in fields relevant to AMS products and we felt it would be best suited to look after the existing user base and carry forward the AMS range of 8 bit products for the BBC Micro".

Acorn is out of the red

NEWS of a brighter financial future for previously ailing Acorn reported in the May issue of *The Micro User* has been borne out by the company's year end results published on April 12.

Acorn Computers achieved an operating profit of £1.6 million for the year ended December 31, 1988 compared with a loss of £2.4 million for the previous year.

Standing at £39.2 million, turnover was up by £3.1 million and net profit after interest and tax was £1.1 million compared with a 1987 loss of £3.3 million. No dividend is being recommended.

Net cash inflow during the year was £7.1 million which the company say has eliminated its overdraft and left it with cash reserves of £2.5 million.

Following his exclusive interview with *The Micro User* reported last month, Harvey Coleman backed up his optimistic comments by stressing that 1988 had been a year of sound progress creating a solid foundation for future growth.

Micros aid prisoners

BBC Micros are helping prisoners towards a more hopeful future.

They are being used on the BTec courses at Stocken Prison in Leicestershire where 70 of the 300 inmates are in full-time education and 60 are on training courses.

Eight BBC Micros are used in the education wing of the category C prison which holds more than 50 men serving life sentences.

"Initially, prisoners are allowed to play games on the micros but many find that this fires their enthusiasm", said business studies tutor Marilyn Shelton. "They go on to learn basic computer literacy and use the machines for business studies.

"Some start to write Basic programs, and where the software is available the micros are also used for computer aided learning, particularly English and maths".

The education officer at Stocken, Chris Frost, told *The Micro User*: "Computers in prisons are quite big business. The main aim is for rehabilitation of prisoners, helping them to achieve new skills which will give them a more hopeful future when they are released".

Information Technology centres have been set up and at nearby Ashwell Prison inmates are doing work which has been contracted out to them by the local authority.

Prize for Lancelot

LANCELOT from Mandarin Software (0625 878888) has scooped second prize in Best Adventure section of the 1989 Computer Arena Awards. Mandarin's marketing manager Chris Payne collected the framed certificate at the Computer Arena trade meeting held recently on Majorca.

ANNOUNCING A MAJOR NEW ARCHIMEDES SOFTWARE RELEASE

Premier

Circle Software are proud to announce a major new software release for the Archimedes. Premier is so new, there is as yet no defined category for it. Is it a word processor? Is it a report generator? Is it a spreadsheet or a data base? Premier fits none of these categories, rather it spans them all. Premier is a major advance in capability from a single program. These are just some of its features -

- ★ ***Powerful command language***
- ★ ***User definable command macros***
- ★ ***All key actions user definable***
- ★ ***Dynamic Text feature***
- ★ ***Fully multi-tasking under RISC-OS***
- ★ ***Compiled command files for speed***
- ★ ***Flexible printer support***
- ★ ***Totally user configurable***

The ability to read and execute commands from files allows any text processing to be carried out just by typing a 'star' command, or picking from the desk-top. Further, the ability to define 'macro' commands, and to assign these to ANY key, allows complete 'applications' to be built, including customised spreadsheets, and simple data bases. A command file defining a full featured word processor, with matching key-strip, is included with Premier, and more applications are being developed.

This word processor alone justifies the purchase of Premier. It allows text to be moved between any number of files open at once, searches to be made forwards or backwards using powerful pattern matching, document headers and footers to be defined, has on screen formatting and other features too numerous to list here. The command file defining this may be edited to tailor the features to your own requirements, a feature not found in any other word processor, on any machine.

DYNAMIC TEXT is a new concept which allows the inclusion of variable items within any document. Such items may show today's date or time, the current value of VAT, or a name and address. The actual text displayed may be computed, defined at the keyboard, or read from a data file. This system facilitates the production of statements and invoices, financial reports, or personalised mail shots.

Premier's powerful command language, which includes maths and string functions, repeat loops and 'if - then' constructs, may be included in the definition of a DYNAMIC TEXT item, allowing full spread-sheet type facilities anywhere on the page, not just in neat rows and columns. This also allows printer codes to be sent, providing the simplest method yet devised to control printer functions from embeded commands.

Premier's pre-release has already created quite a stir and demand is increasing, so act now. Write or phone for full details, a refundable demo disc, or the full version of this exciting new product. Price including 160 page manual, word processor application, key strips, and free updates during 1989, £96 + VAT, post free.

Please supply -

☐ Full details of Premier
☐ A £5 refundable demonstration disc
☐ Premier with 160 page manual
☐ I enclose my cheque for the full amount
☐ Please debit my credit card account

Name:-
Address:-

SIGNED:-

CARD NO:

EXP. DATE:

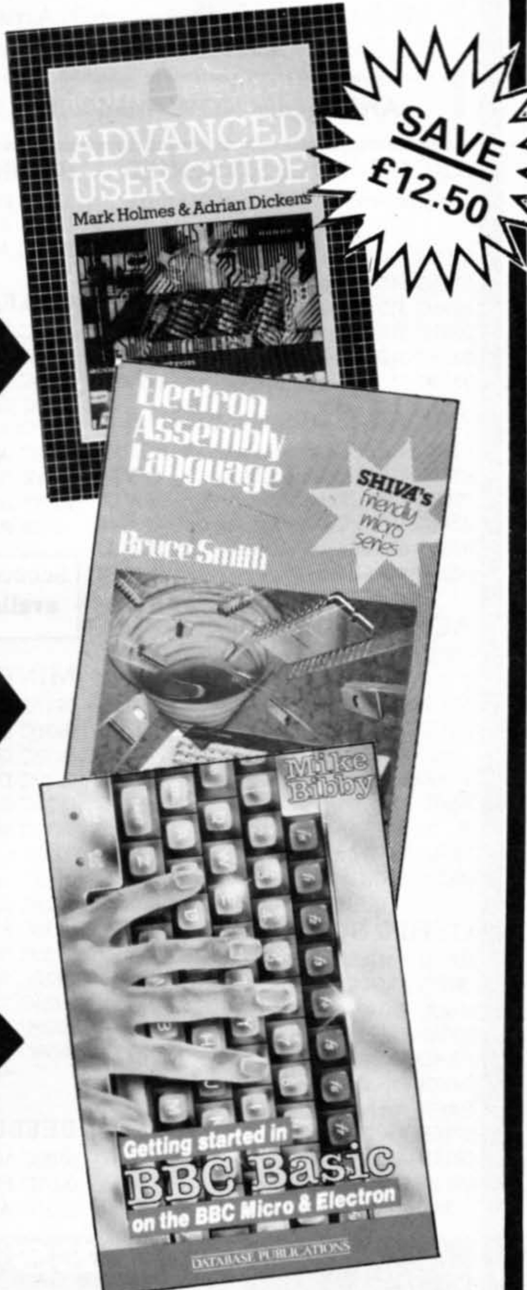
Circle Software

33, Restrop View,
Purton, Swindon,
Wilts. SN5 9DG
Tel: 0793 770021

Here's how you can get the very best out of your Electron

Within the pages of these three books you'll find ALL the information you need to fully harness the power of your Electron. They cover Basic, machine-code programming and the operating system, and between them they also show how to combine all three to create more powerful and effective programs.

For the give away price of just £7.95 for the three, these books represent exceptional value and are a must for any serious Electron user.


SAVE £12.50
ADVANCED USER GUIDE
Mark Holmes & Adrian Dickens
Electron Assembly Language
SHIVA's friendly micro series
Bruce Smith
Mike Bibby
Getting started in BBC Basic on the BBC Micro & Electron
DATABASE PUBLICATIONS

Electron Advanced User Guide

This detailed guide to the Electron's operating system is packed full of invaluable information. It shows you how to:

- Implement the powerful *FX/OSBYTE calls
- Write your own paged roms
- Program the ULA
- Make every byte count where program space is tight
- Use the Electron's exciting capabilities to the full by following the complete circuit diagram

. . .and much, much more.

This essential handbook will help you to exploit the full potential of your Electron. And for just £2.95, saving £6.50 off the recommended price, can you afford not to miss this offer?

Electron Assembly Language

The Electron Assembly Language reference guide will help you get to grips with machine code in next to no time. Whether you're a beginner or are already fairly proficient, there is something for you in this book.

It has over 200 pages packed with hints, tips and example programs on subjects ranging from basic hex, binary and decimal number theory and logical operators, through addressing modes, stacks and loops, to subroutines, jumps and calls.

Every aspect of machine-code programming is covered in this book in a friendly, readable style, and there's also a comprehensive index. If you want to get more out of your micro, but thought machine code was indecipherable, this is the book for you. *Save £3 off the recommended retail price.*

Getting started in BBC Basic on the BBC Micro & Electron

This is the ultimate guide available on BBC Basic. Written by a leading expert on the language, it will lead you through each Basic function in a simple, easy-to-follow style.

Whether you are a beginner or more advanced, there are examples of commonly-needed routines and neat tricks you can use to make Basic jump through hoops.

By working through its many examples you will gain a clear insight into structured programming and will quickly acquire the ability to use structured techniques in creating your own programs. *Save £3 off the recommended retail price.*

Only
£7.95 for all three

Buy your copies NOW, using the order form on page 135

Dolphin Place, Holywell Hill,
St.Albans, Herts., AL1 1EX.

The recognised Archimedes specialists

24 Hour Hotline
☎ (0727) 40303
FAX (0727) 60263

MEMBERS SPECIAL OFFER

WHEN BUYING AN ARCHIMEDES SYSTEM WE WILL GIVE YOU ABSOLUTELY FREE:

PC Emulator, Printer Lead, Ten 3.5" discs & Lockable disc box;

OR

0% finance (see other advert), Artisan, Printer Lead, Ten 3.5" discs and Lockable disc box.

When buying a 440 we will also give you, in addition, 1st Word Plus and Acorn's Software Toolbox.

Archimedes *NOW* fitted with RISC OS as standard

ARCHIMEDES 300 SERIES

New prices from April 3rd with RISC OS fitted

0193G 310 Entry System	899.00
0194G 310 Mono System	959.00
0195G 310 Colour System	1119.00
0257G 310M Entry System	959.00
0258G 310M Mono System	1019.00
0259G 310M Colour System	1179.00

ARCHIMEDES 400 SERIES

0260G 410/1 Entry System	1199.00
0261G 410/1 Colour System	1419.00
0262G 420/1 Entry System	1699.00
0264G 420/1 Colour System	1919.00
0263G 440 Entry System	2529.00
0265G 440 Colour System	2749.00

ACORNSOFT

1080D Ansi C Release 2	94.05
1081C ISO Pascal Release 2	94.05
1082D Fortran 77 Release 2	94.05
1083B Twin	27.55
1084D Logistix	94.05
1086D Prolog X	189.05
1087D Lisp	189.05
0900B PC Software Emulator	94.05
1088D 1st Word Plus	75.95
0902D ARM Assembler Package	189.05

OTHER SOFTWARE

0903B EMR Sound Synthesiser	41.26
0904B EMR Creations Disc	16.48
0948C EMR Studio 24	81.78
0905E Logotron Logo	57.00
0906D Pipedream	94.05
0917B Pipedream Spellcheck	40.85
0909B Archeffect	20.64
0910B ArcTFS	24.74
0911B AutoSketch	75.62
0914B Lingenuity Presenter	24.65
0938C ABC - Basic Compiler	82.57

BOOKS (No.VAT)

1242C Programmers Ref. Man.	28.45
1211B Arch. Assembly Lang.	14.20
1243C Arch. Operating System	14.20

CLARES

0937C Pro-Artisan	140.39
1095C Artisan	31.27
1099C Artisan Support Disc	16.48
1096C Graphic Writer	23.44
1097C Archimedes Toolkit Plus	39.10
1098C Alpha Base	39.10
1094B Sound & Graphics Demo	9.50
1079B Arc Buffer Module	16.48
1078B Render Bender	66.04

Second-hand Archimedes now available - Please telephone.

MINERVA

0947C Home Accounts	41.26
0931C Sigmasheet	57.78
0932C Gammaplot	57.78
0920C Deltabase	24.74
0921C System Delta Plus	57.78
1233C Sys. Delta Plus Ref. Man.	24.74
0922C Order Processing*	53.65
0923C Sales Ledger*	53.65
0924C Stock Manager*	53.65
0925C Purchase Ledger*	53.65
0926C Nominal Ledger*	53.65
0927C School Administrator*	66.04
0928C Video Rental*	57.70
0929C Reporter*	20.61
0939C Mailshot*	33.00

* Requires System Delta Plus

BEEBUGSOFT

0100C Masterfile ADFS	14.35
0101D Hearsay	45.00
0102B Archimedes DFS Reader	8.61

OTHER HARDWARE

0805D CC ROM Podule	46.55
0806B Battery Backup for above	9.50
0803B Armadillo Sound Sampler	104.50
0825C IEEE488 Podule	269.71
0802C Chromalock Podule	280.25
0808C Watford Video Digitiser	236.55

ARCHIMEDES UPGRADES

0234B Econet Board (as M128)	40.37
0266C 0.5Mb RAM (305 only)	141.55
0267G Floppy Disc Drive	118.75
0268G 20Mb Hard Disc (300's) *	474.05

It is recommended that the Hard Disc is fitted by a dealer. This is a FREE service, please contact us for details.

0269C Podule Backplane	37.05
0270D ROM Podule *	56.05
0271D I/O Podule *	80.75
0272D MIDI add-on to I/O	37.05
0273D MIDI Podule *	65.55

* Requires Podule Backplane

ARCHIMEDES LEADS

0832B Keyboard Extension Lead	6.91
0558B SKART Lead	7.78
0425C Archimedes Printer Lead	7.78
0795C 5.25" Disc Drive Buffer II	28.91
0796C Serial Link Kit & Disc	15.00
0797B Just Serial Link Cable	10.00
0828B Arch. Audio Lead	5.17

ARCHIMEDES GAMES

0952B Corruption	20.61
0950B Quaser	9.87
1122B Repton 3	16.48
0945B Terramex	16.48
0946B Pacmania	16.48
0935B Dread Dragon Droom (ed.)	15.65
0949B Word Up Word Down	14.83
0944B Fish	20.64

ARCHIMEDES ACCESSORIES

0794B Arc. Spiral Bound Keystrip	2.57
0789B Blue Beebug Mouse Mat	3.04
0788B Red Beebug Mouse Mat	3.04
0716B Archimedes Dust Cover	7.43

Please add 15% VAT and then carriage

Carriage is denoted by the letter contained in the stock code. A-60p, B-£1, C-£2, D-£3, E-£4, G-£7. When ordering several items, use the highest price code and half of each subsequent code. For courier delivery use code G.

Credit Cards

Access and Visa orders are welcome, and may be placed by letter or telephone (24 hours).

PRICES EXCLUDE VAT

Prices shown are BEEBUG or RISC USER members prices only. To join, simply send £14.50 for a years subscription, which will entitle you to quality technical support, user group magazines & up-to-date information on new products mailed to you ten times a year, and competitive prices on all items of stock.

Our non-members prices are normally at least 5% higher.

NEWS beat

Software firms planning to boost games sales

THE UK's top entertainment software houses have joined forces to wage war on software piracy and boost the popularity of computer games.

One year after it was mooted, the Entertainment Software Publishers Association (ESPA) has been formed with many BBC Micro software firms among its initial membership.

Its aim is to radically change the face of the British home computer industry, which it claims will be in everyone's interest, including that of the games playing public.

Main target of ESPA is to improve the popularity of computer games. "The consequent expansion will be good news for games players because a bigger market means a bigger choice and better products which are more easily available", said ESPA publicity man Michael Baxter.

One way the new association intends to carry out its key aim is through publicising computer games on television and in daily newspapers.

"The basic aim is to educate people in the television and newspaper world about the games software industry", said Michael Baxter. "This means that it will be easier to persuade parents to buy software or hardware as Christmas presents".

Gathering more market information is another ESPA target. In the past, software houses have each had their own market research budget which produced similar results for each company. The association will now put all subscription money in one hat and use it to obtain a lot more information on what its customers want.

One of the strongest aims of ESPA will be to support FAST – Federation Against Software Theft – in the fight against software piracy.

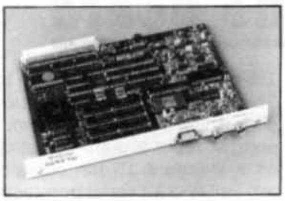
Piracy costs the industry millions of pounds and also affects the end users. ESPA and FAST will combine to produce a strong publicity drive aimed at persuading games players to boycott pirate software. It is also hoped to lobby MPs with a view to changes in the law.

The idea for a publishers association was first floated last year at the Computer Arena meeting for the industry in Jersey. It became reality at this year's meeting in Majorca.

Speaking there, Bob Hay, coordinator of FAST, outlined various ways of combating piracy.

Database Publications, Computer Trade Weekly, Future Publishing, Newsfield, Gollner and EMAP all agreed to run FAST advertisements.

Initial membership of ESPA includes Database Software, US Gold, Ocean, Elite, Mirrorsoft, Virgin Mastertronic, Hewson Consultants, Grandslam, Alternative Software, Psygnosis, Domark, Audiogenic and CDS. Andrew Hewson was appointed interim chairman.



High speed algorithms

AFFORDABLE, high performance image processing is now possible with the new Hawk V10 expansion card developed for the Archimedes by Wild Vision (091-281 8481).

Aimed at science and industry, it can perform standard algorithms several times faster than a similarly priced PC and framestore combination. It exploits the 4 mips processing power of Acorn's 32 bit Risc technology and the latest Risc OS.

The Hawk V10 captures, stores and displays four separate images in real time and totally independent of the host Archimedes machine. This leaves the micro free to manipulate and process the large amounts of data contained in an image at very high speeds.

Prices start at £747.05.

The grail is found

A LIFELONG interest in the legend of King Arthur has paid off handsomely for John Sweeney of Nottingham.

He is now the owner of a £5,000 replica of the Holy Grail, first prize in the national treasure hunt competition devised by Mandarin Software (0625 878888).

Arranged to coincide with the launch of Mandarin's Lancelot title based on the legend of King Arthur, the quest started in October last year.

Since then contestants have followed increasingly difficult clues to find the hiding place of the grail, an impressive replica gilded with 22 carat gold and encrusted with amethysts, garnets and opals.

Using his specialised knowledge of the legend, it took John 27 hours to solve the final set of mind-bending clues and be first to come up with the hiding place – the Cerne Abbas Giant etched into chalk in a Dorset hillside.

A systems analyst with IBM in Nottingham, John lives in nearby Clifton with his wife Maggie and sons Mark and Alex.

John Sweeney: First to the treasure

"When I was a child I had a full set of models of Arthur's knights", he said. "I have always been interested in legend and myth, and since computer games came out I have also been interested in those.

"This competition gave me the chance to combine the two, but towards the end the clues were very hard and at times obscure".

To crack the quest, John used 30 reference books ranging from legends to obscure archeology. Of particular help was his old copy of Le Morte d'Arthur containing a glossary not found in modern versions.

Initial clues were coded into copies of the Lancelot game.

Keeping it quiet

A NEW hush thermal paper printer for the BBC Micro has been launched by Stockport-based Dram Electronics (061-429 9001).

Key features include bidirectional text printing at 80 characters a second, less than 56 decibels of noise and alphanumeric print ranging from 80 to 160 characters. It is also graphic dot addressable with 4,800 dots per square inch.

Price £114.94. A battery model costs £25 extra.

NEWS *beat*

Spreadsheet for blind

NEW employment possibilities for visually impaired people have been opened up by a unique talking spreadsheet. Audiocalc will also make it easier for them to keep personal and domestic records.

St Dunstan's, the nationwide organisation that cares for men and women blinded in the services, has acquired the distribution rights. It was devised by software consultant Philip Jennings while he was a student.

Used with commercial voice synthesisers, it enables the blind or partially sighted to carry out a wide range of record keeping and accounting tasks with a BBC Micro.

Audiocalc has been tested by a number of pilot users including Peter Jones who, in retirement, has become a researcher for St Dunstan's.

It needs an Acorn Speech Chip, Microvox, Votrax Type 'n' Talk or Braid voice synthesiser. Anyone interested should contact David Castleton at St Dunstan's, 12-14 Harcourt Street, London W1A 4XB. Tel: 01-723 5021.

Peter Jones (standing, left) and Philip Jennings supervise Norman Walton as he tests Audiocalc at St Dunstan's

Sampling on the Arc

MULTI-tasking has been harnessed to music by Leicestershire company Armadillo with its 8 bit and 16 bit sound samplers designed for use with the 32 bit Risc based Archimedes.

Its new HighNote software takes advantage of the 4 mips processing power and windowing facilities to provide a sampling package for both mono and stereo systems.

The 16 bit package, developed for professional musicians, includes a multiple modules system which automatically loads utility modules and adds them to the icon bar at the base of the screen. It also provides memory joggers on functions and facilities whenever the mouse pointer is over an icon.

Down the scale, the 8 bit range of sound samplers comes in three versions. The mono A448 system is supplied with Armadillo's ADIT editing program which provides nine different sampling rates.

The stereo version has two input sampling channels for using the HighNote software, while the stereo/midi version also includes a built-in Midi port. It is supplied with the HighNote Midi version.

"Our samplers were designed specially to run on the Archimedes because of its power, speed and flexibility, giving twice the capabilities of many other competitors at half the price", said Milton Wynne, director of Armadillo Systems (0572 822499).

The 16 bit sampler and HighNote software costs £1,411.76 and the 8 bit range starts at £158.82. A backplane is needed to fit the sampler card to the Archimedes.

More on the board

FIVE functions on one board is the achievement of Brainsoft (01-486 0321) with its new expansion card for the Archimedes.

It adds a multiple input/output system carrying video and sound digitisers, an RS232 interface, a joystick interface and three rom sockets.

The video digitiser can capture a stationary image in 1.5 seconds, converting it to 256 grey levels. The joystick port, which doubles as an input port, accepts a digital joystick on a standard 15 pin connector. Full RS232 serial port facilities are provided, including all modem control lines.

"The rom sockets allow the use of treasured rom software from a BBC B or Master as long as it follows the Acorn protocols", said a spokesman.

"We tried to pack as much as possible on to the board using miniaturised components to give good value for money".

The expansion card costs £123.05.

Arc prices increased

ENHANCED performance through Acorn's new Risc OS multi-tasking system has brought enhanced prices in its train – the company has increased its recommended retail prices for the Archimedes 130 and 310M machines.

The 310 has gone up from £960.25 to £1,033.85 and the 310M from £1,029.25 to £1,102.85. No changes have been made to the price of the Archimedes 440 but the Master 128 has increased to £504.85 from £458.85.

All Archimedes 300 and 400 series machines have been supplied with the new enhanced multi-tasking operating system since April 3. Existing owners can buy upgrade packages from £33.35 for a special introductory period.

Bundled with Risc OS are three multi-tasking applications, a text editor, drawing package and art suite worth well over £100.

Acorn managing director Harvey Coleman told The Micro User *that the company is setting stiff criteria for dealers wanting to handle its new Unix R140 Risc-based workstation. It has set up an initial network of 25 dealerships with appointments in the hands of Hugh Symons Distribution Services from Dorset.*

Speedy reader

SPEED reading is a useful asset and a new BBC Micro program promises to double effective reading speed in 20 lessons.

"This is not a gimmick of the 'You too can have a full head of hair' variety. This program actually works as it uses proven techniques" says David Crombie of developers Speed Read Technologies (01-742 2449).

BBC Micro version costs £29.95.

JOIN
BEEBUG or RISC USER
and let us help you with your
BBC MICRO, MASTER or ARCHIMEDES

How do members benefit?

Access to a wide range of quality programs, all free to members.

Free, unlimited advice from our Technical Support team in selecting hardware and software to suit your needs, and help with any technical problems.

5% discount (or more) on hardware and software purchased through our shop or speedy mail-order service.

Interest free and low-cost credit schemes for larger purchases.

Good selection of re-conditioned BBC micros, Masters and Archimedes computers.

And best of all, a regular magazine.

Which group should I join?

If it's the BBC Micro (Model B, B+, Master or Compact) which interests you, then BEEBUG with seven years experience of supporting such machines is the group for you.

If it's the Archimedes that you use, or are considering, then RISC User is the group to join.

Both User groups benefit from their own regular magazines, published 10 times per year, and packed with impartial reviews, programs, and articles for all readers. All back issues are kept in stock, and the wealth of information and programs which they contain provides a valuable resource to help you make the most of your micro.

BEEBUG MAGAZINE

Recent issues have included:

● File Handling ● Centres of Gravity ● 3D Landscapes ● FS and ADFS Utilities ● Computer Aided Design ● Page Composition ● Real-Time CLock ● Game Strategy

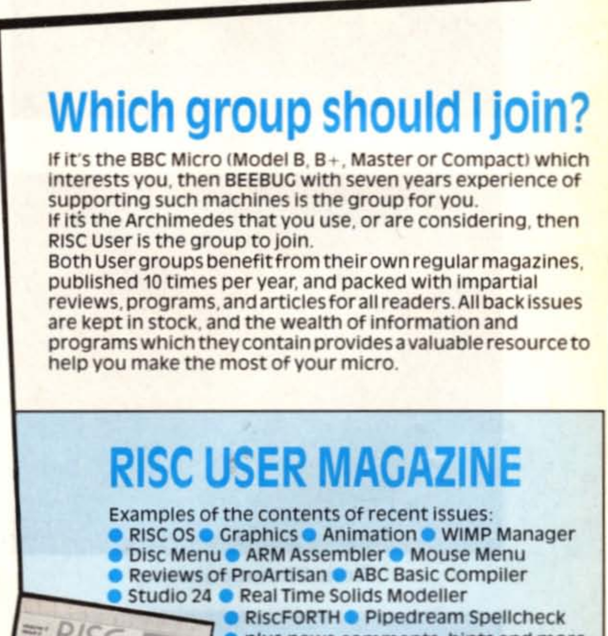
Regular features covering 512 co-processor, education, communications, news, letters, hints, reviews, workshops, beginners' series, etc.

BEEBUG
FOR THE BBC MICRO & MASTER SERIES
Centres of Gravity
Beebug ICON Designer
USING SPREADSHEETS
KNIGHT'S TOUR
ASTAAD 3 Computer Aided Design
PRINT FORMATTING
DESIGNING ICONS
INTEGRA-B REVIEW
USING A MOUSE

RISC USER MAGAZINE

Examples of the contents of recent issues:

● RISC OS ● Graphics ● Animation ● WIMP Manager
● Disc Menu ● ARM Assembler ● Mouse Menu
● Reviews of ProArtisan ● ABC Basic Compiler
● Studio 24 ● Real Time Solids Modeller
● RiscFORTH ● Pipedream Spellcheck
● plus news, comments, hints and more


RISC USER
Fractal Scen
Image Wrap and Spin
THE MAGAZINE AND SUPPORT GROUP EXCLUSIVELY FOR USERS OF THE ARCHIMEDES

HOW MUCH DOES IT COST?

All the benefits are available for just £14.50 per year (UK only). Please phone us for details of joint BEEBUG/RISC User subscriptions.

Subscribing to BEEBUG or RISC User could be the best decision you'll ever take about your BBC micro or Archimedes.

I would like to subscribe to, and become a member of:
☐ BEEBUG Magazine and Support Group
☐ RISC USER Magazine and Support Group
Please Tick

Name ______________________

Address ______________________

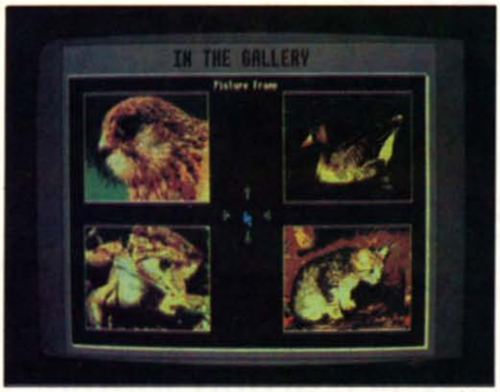
I enclose a cheque for £________ (all cheques must be in pounds sterling drawn on a UK bank) or:
Please debit my Access/Visa account No ____/____/____/____
M6/06
Expiry Date ____/____ Signature ______________

Join NOW, either by phoning (0727) 40303 and quoting your Access/VISA/Connect card number, or by completing and returning the adjacent form with your payment.

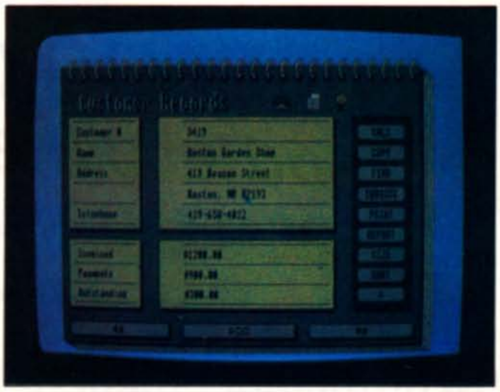
Send to: **BEEBUG LTD**

Dolphin Place, Holywell Hill, St. Albans, Herts AL1 1EX or telephone our 24 hour hotline: St. Albans (0727) 40303. Fax: (0727) 60263. Micronet: *BEEBUG

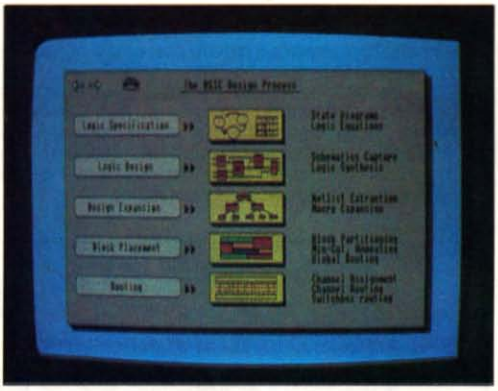
MACH


IN THE GALLERY
Picture Frame

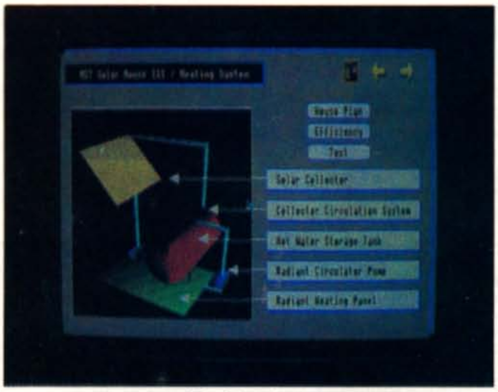
From Art


Customer Records

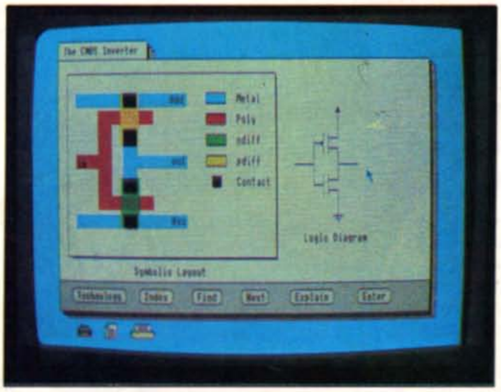
To Accounting


Logic Specification
Logic Design
Design Expansion
Block Placement
Routing

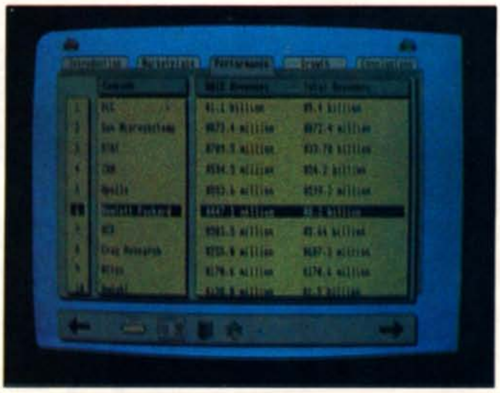
From Documentation


House Plan
Efficiency
Test
Solar Collector
Collector Circulation System
Hot Water Storage Tank
Radiant Circulator Pump
Radiant Heating Panel

To Design


The CMOS Inverter
Metal
Poly
ndiff
pdiff
Contact
Logic Diagram
Symbolic Layout
Technology
Index
Find
Next
Explain
Enter

From Engineering


Introduction
Performance
Graphs
Conclusions

To Economics

HYPERBASE

THE DYNAMIC MEDIA ENVIRONMENT OF THE FUTURE

An advanced database architecture supports 'cards' and 'stacks' which can contain both textual and graphical information in any combination.

Anyone from DP professionals to children can use the buttons and links to create a powerful web of information with rapid navigation, exploration and retrieval facilities.

£49.95

TECHNOLOGY

MODULA-2 COMPILER

An optimising compiler for the Archimedes based on Wirth's 4th Edition Definition.

MAIN FEATURES

- ★ Modula-2 advanced development environment
- ★ Separate compilation
- ★ System library support includes RiscOS, graphics and WIMP support
- ★ Program libraries include packages for manipulating abstract data structures
- ★ Run time error checks and support
- ★ User control over global and local optimisations
- ★ Fast compilation time enables rapid prototyping and development cycle
- ★ 3rd edition compatibility
- ★ Extensive documentation includes a Modula-2 tutorial with numerous example programs.

£89.95 inc

MACH BASIC

COMPARE MACH BASIC'S PERFORMANCE ON THE RELEVANT CRITERIA

CODE GENERATION

Mach Basic uses a Production Quality code generator using state-of-the-art optimisation techniques. Compare this to a primitive register allocation method from one competitor and erroneous handling of the semantics from the other.

LANGUAGE SUPPORT

Full Basic V support includes powerful extensions to the compiler while maintaining interpreter compatibility. Mach Basic correctly handles dynamic scoping, local variables and arrays unlike the competitors.

COMPILATION SPEED

We used formal minimisation techniques to generate a table-driven parser.
The result —the fastest compiler on the market.

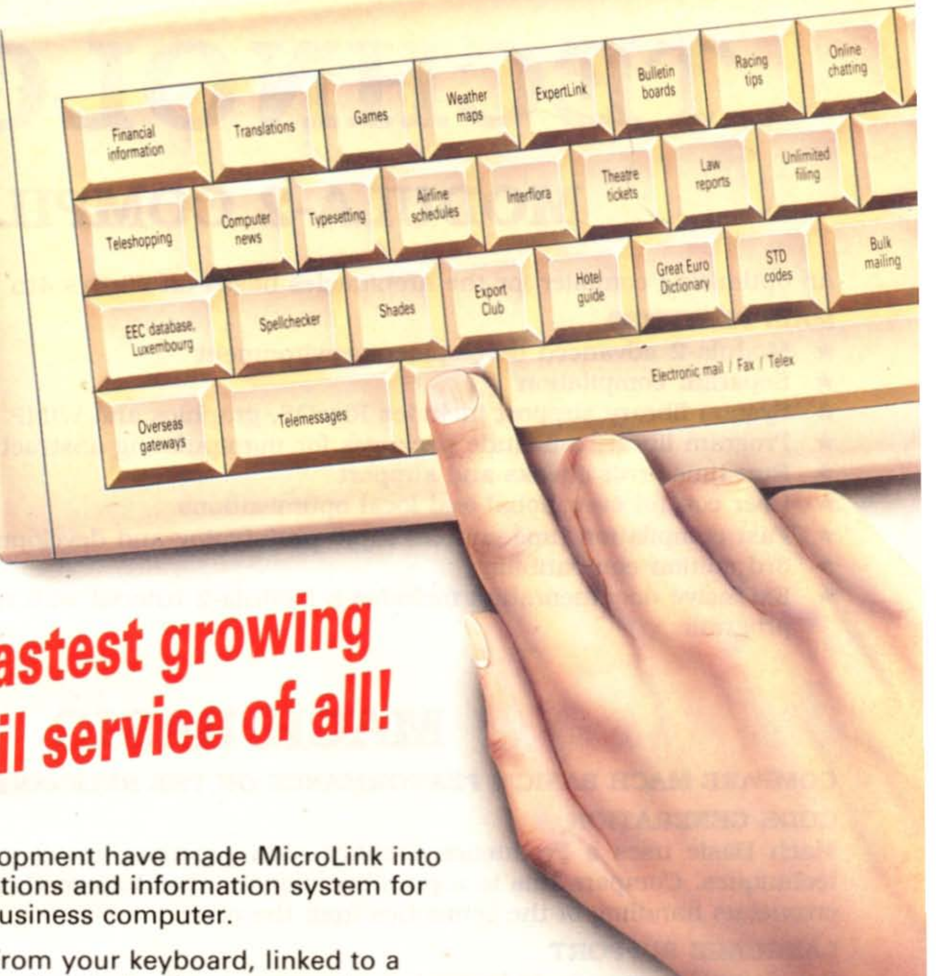
WE DON'T EXPECT YOU TO CUT CORNERS

SO WE DIDN'T . . . EXCEPT FOR THE PRICE £39.95 inc

WHY PAY MORE FOR LESS?
20MB DISK SYSTEM £249

Compatible with A305-310. Requires backplane and fan
All prices include VAT and delivery in the UK except for the hard disk system
MACH TECHNOLOGY

75 HYDEWOOD ROAD, LITTLE YELDHAM, ESSEX CO9 4QX
Tel: (0787) 238125 (Monday-Friday 9am-5pm)


Financial information
Translations
Games
Weather maps
ExpertLink
Bulletin boards
Racing tips
Online chatting
Teleshopping
Computer news
Typesetting
Airline schedules
Interflora
Theatre tickets
Law reports
Unlimited filing
Bulk mailing
STD codes
Great Euro Dictionary
Hotel guide
Export Club
Shades
Spellchecker
EEC database, Luxembourg
Electronic mail / Fax / Telex
Overseas gateways
Telemessages

Look what's waiting for you ... when you join the fastest growing electronic mail service of all!

Four years' continual development have made MicroLink into the COMPLETE communications and information system for everyone with a home or business computer.

And it's so easy to use. From your keyboard, linked to a modem and phone, you can directly key into the services provided by Telecom Gold – and many, many more.

Every day thousands of electronic mail messages pass between MicroLink subscribers throughout Britain . . . and many other parts of the world. From their keyboard they can also send telex and fax messages, without the need to buy expensive equipment.

MicroLink can be used with ANY computer, from a tiny hand-held Psion Organiser or Z88 portable to the most sophisticated computer of all. And from anywhere where there is a telephone point.

So if you want to speed up your mail, tap into a weather satellite, carry out company searches, obtain free legal and financial advice, order flowers, book theatre tickets, negotiate a mortgage, help yourself to free telesoftware programs – or go adventuring in the land of Shades, the world's biggest multi-user game – then there's only one answer – MicroLink.

One number to dial . . . one security password . . . one simple log-on . . . and you're only a keystroke away from the best information and entertainment services now available!

FIND OUT MORE ABOUT MicroLink

Please send me more facts about MicroLink

Name ____________________

Address ____________________

Send to: MicroLink, Europa House, Adlington Park, Adlington, Macclesfield SK10 4NP. MU6

Use TELECOM GOLD FREE* for a month!

When you send in the form alongside you will receive a unique invitation to join MicroLink, with FREE registration and telex validation (normally costing £15), and a month's FREE* connect-time to your MicroLink/Telecom Gold mailbox. So you can find out for yourself what MicroLink is all about without it costing you a penny.

* This exclusive offer relates to connect time only and does not include telephone, any possible PSS charges or surcharged services.

Winchester Users

-Discard the Soft Option!

At last, a real solution to the problems of hard disc back up — the new Amcom Tapestreamers.

Amcom Tapestreamers provide a fast, reliable and economic means of backing-up the large amounts of data stored on Winchester hard disc systems. The speed and ease with which data is streamed onto magnetic tape makes backing-up faster, easier and more convenient with total Data Integrity. Multiple copies are easy to make, and data is quickly transferred back to the hard disc when required.

Amcom Tapestreamers provide:-

- Affordable Winchester Back-up
- Reliable Data Transfer.
- Fast Operation (80k/sec).
- Easy Multiple copies.

Amcom Tapestreamers are available to run not only on Amcoms definative E Net Winchester based networks, but also on Amcom's new ADFS compatible Winchesters and standard Acorn hard disc systems.

£699 (ex. VAT)

NOW AVAILABLE FOR ARCHIMEDES
£999 ex VAT.

Amcom

Crendon Place, Amersham. HP6 5HN.
Fax: 0494 432400

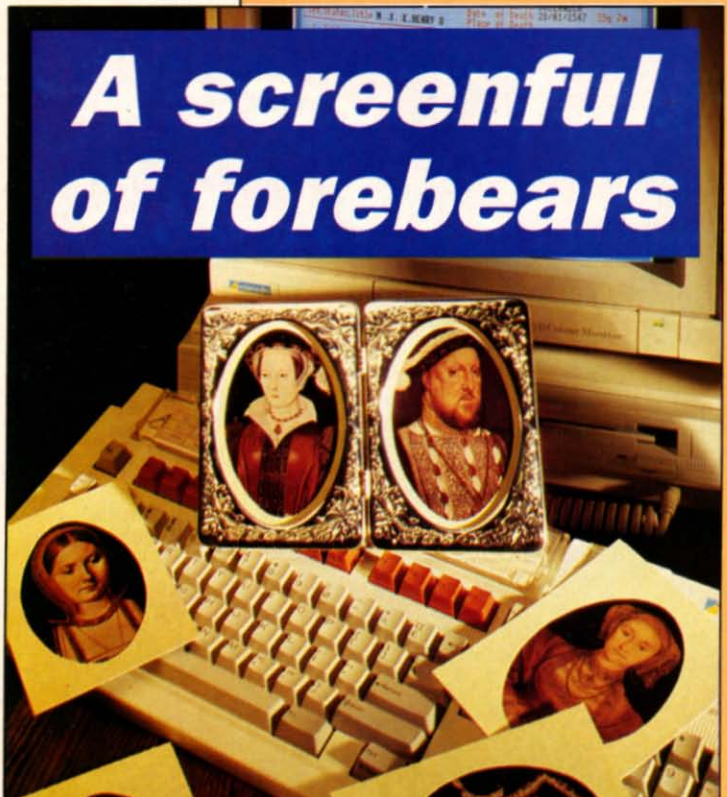
A screenful of forebears

Bruce Goatly climbs some family trees

MOST people are curious about their ancestors, even if the interest only extends to anecdotes of Aunt Maud's first encounter with a car or Uncle Bill's shady past. For some though, studying their family tree is an absorbing pastime and to go into it seriously you need to keep records of births, deaths, dates of marriage and who married whom and had which children.

Keeping such records on index cards can be messy and does not allow easy searching and sorting once the amount of information accumulates, as it quickly does. Also, drawing a neat family tree by hand in traditional format is a tricky job.

A computer database is an obvious medium for marshalling all these facts, but it needs to be designed specially to let you add, amend and link individual records – a link is a relationship such as marriage or parentage – and display them in helpful ways. Two such specialised programs are looked at here – Ancestory for the Archimedes and Family History System for 8 bit BBC Micros or Archimedes.



Product: Ancestry
Price: £79.95
Supplier: Minerva Software, 69 Sidwell Street, Exeter, Devon EX4 6PH.
Tel: 0392 437756

THIS package contains a program disc, a registration form for software support and a well presented and illustrated 56 page manual where the arrangement is so clear and the cross-referencing so comprehensive that the index is almost unnecessary.

Booting the disc loads an attractive title screen and an initial menu offering six options. These include running the main Ancestry program, viewing information on the current version of the software, printing a traditional family tree chart and creating a new file for supplementary information.

The Ancestry program is where you add, alter or remove people's details, link their records together, browse through the records on screen, search for a record and select data to output reports in various formats to screen, disc or Epson-compatible printer. The feature that will almost inevitably cause the most excitement is the ability to hold and recall pictures as part of the data.

The number of records you can keep in any one database depends on what information you want to retain. The standard facts about each person are kept in the micro's memory – a 1Mb machine can store more than 3,000 records. Each record, which you can picture as an index card, contains spaces for surname, forenames, byenames – such as nicknames – sex, status, title, and dates and places of birth and death.

Extra information on each person is kept in a disc file – a user file – and each card can hold 15 lines of 50 characters. Lines can be reserved for specified purposes if you wish and an 800k disc has room for 1,000 such cards – the biggest user file you can have. On the other hand, a 4Mb machine with a 20Mb hard disc can store more than 10,000 records even with a user file. This is serious genealogy.

The pictures are stored as sprites in separate files and can be created with a digitiser, an art package or the Sprite Editor on the Welcome disc, but not with Ancestry itself. To link in someone's picture you record the sprite information on their card in the user file.

To accustom yourself to Ancestry's features – which is not hard – there is a tutorial section on the Royal Family database on the disc, which contains 100 records extending from Henry VII to the present day.

Having loaded the file you find yourself in Tree mode which shows cards laid out in a truncated family tree on screen. King Henry VII is in the centre with his wife Queen Elizabeth to his right and a stack of three cards, representing their three children, below the equals sign joining the king and queen. In Tree mode each card shows the essential details, with an option to include current or final age.

A row of icons at the foot of the screen shows the choices available, some of which are accessible by several routes. For instance, to change from Tree to Card mode, where you zoom in to the details on one card, you can either use the icons or simply click on the central card. Returning to Tree mode is similarly easy.

Moving around the tree, discovering relationships and following the royal lineage, is quick, effortless and natural. Clicking on any of the cards moves it to the central position and redraws the tree around it. Where there is a stack of cards – multiple children, siblings or spouses – you can flick through them by clicking on up or down arrows on the card's bottom edge.

For more extensive searches you use the Seek option, which basically lets you look at cards which match a chosen name. Alternatively, the position in the file is shown by a vertical bar in a horizontal strip and you can move to any part of the file by clicking at that point on the strip.

An Extras option gives you a wide range of choices such as whether to display forenames or byenames in Tree mode, to calculate the number of generations from a given card, to allocate specific uses to any of the 15 fields in the user file or to undo a link between cards.

In Card mode the links are shown over two pages. The first contains marriages and partnerships and the second lists the immediate family. If a user file is active its contribution can be called up as Page 3.

Having learnt the principles, you are now ready to enter details of your own family tree. This is done in Card mode and is very straightforward, with 10 standard items to complete. The entry of dates is uncompromisingly DD/MM/YYYY, although question marks can be used to show uncertainty.

Linking records is also easy. It involves choosing between a partner link or a child link and entering two record numbers to be linked, after searching if necessary. Various error checks stop you from performing a marriage before birth or after death, for example, or linking a child to only one parent. The software makes sensible inferences from information provided, as when one partner predeceases the other.

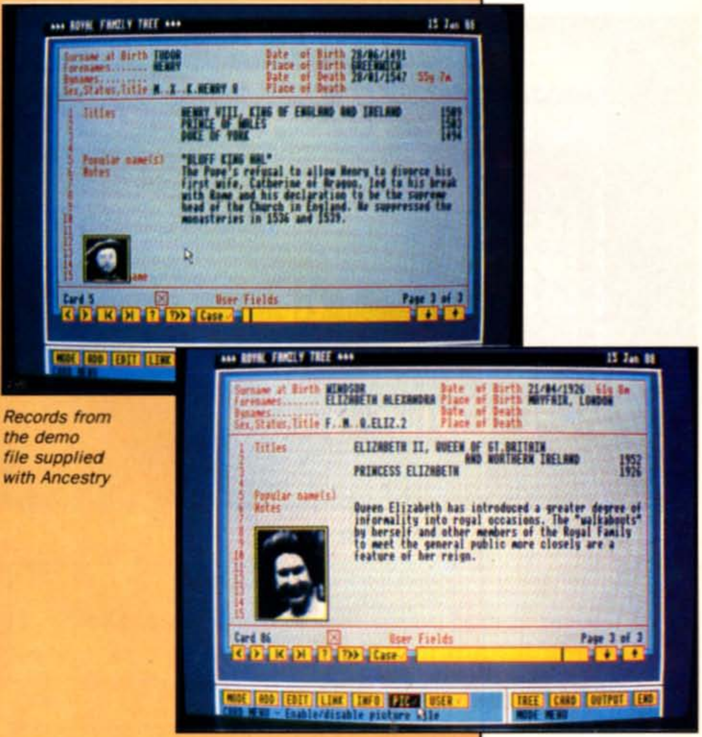
Merely recording data is the easy part of genealogy. It is Ancestry's third mode – Output – that really exploits the power and speed of the computer, carrying it beyond being merely a repository and using its ability to recombine data to generate summary reports.

The range of possible reports is comprehensive. Even the standard ones can be tailored to your needs and displayed on screen, sent to the printer or spooled to disc. Data can also be exported to disc in a choice of formats for use with other databases or spreadsheets.

Standard reports include those on individuals, families, ancestors, descendants and the familiar genealogical chart, which is printed out sideways. If it's too big to fit on to one width of the paper it can be printed in sections for later assembly.

The separate Report Generator option allows you to select records that meet various conditions that you specify as Basic-like expressions. Non-programmers need not be deterred from this because the manual is very thorough and reassuring. Once extracted, records can be sorted on any field. The report you end up with can be as brief or as detailed as you wish.

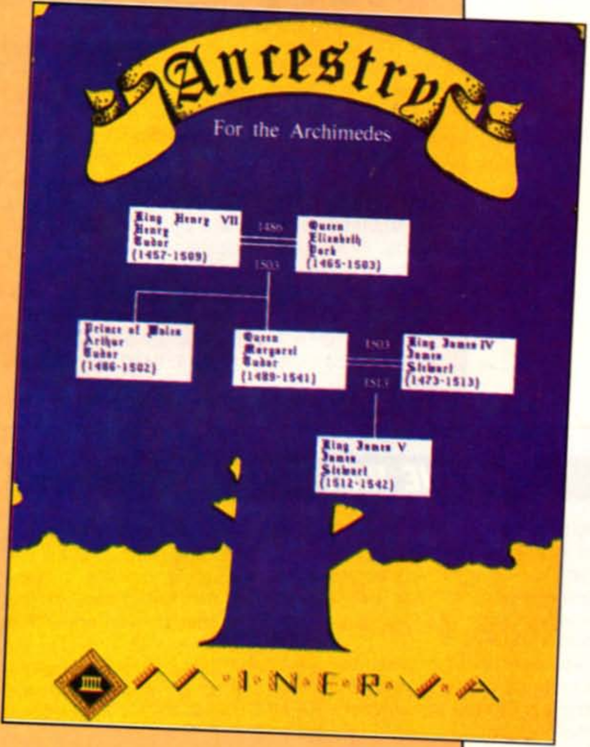
Turn to Page 22 ▶

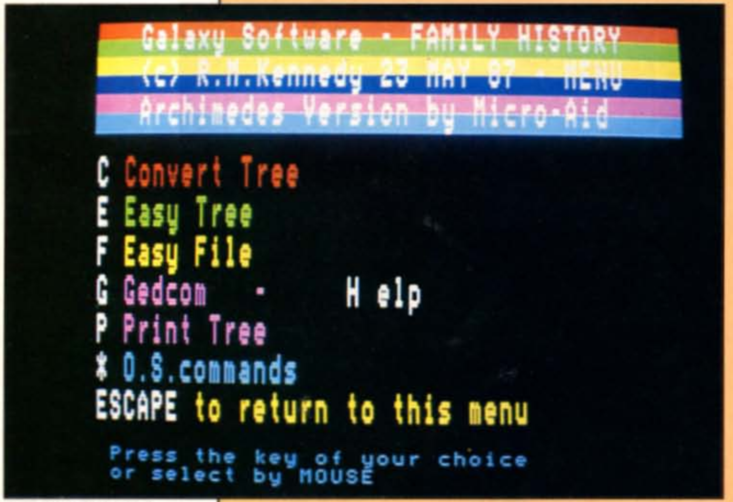


```
*** ROYAL FAMILY TREE ***                                  15 Jan 88
Surname at Birth TUDOR             Date  of Birth 28/06/1491
Forenames....... HENRY             Place of Birth GREENWICH
Bynames.........                   Date  of Death 28/01/1547  55y 7m
Sex,Status,Title M..X..K.HENRY 8   Place of Death

Titles            HENRY VIII, KING OF ENGLAND AND IRELAND        1509
                  PRINCE OF WALES                                1503
                  DUKE OF YORK                                   1494

Popular name(s)   "BLUFF KING HAL"
Notes             The Pope's refusal to allow Henry to divorce his
                  first wife, Catherine of Aragon, led to his break
                  with Rome and his declaration to be the supreme
                  head of the Church in England. He suppressed the
                  monasteries in 1536 and 1539.

Card 5                      User Fields                     Page 3 of 3
```

```
*** ROYAL FAMILY TREE ***                                  15 Jan 88
Surname at Birth WINDSOR             Date  of Birth 21/04/1926  61y 8m
Forenames....... ELIZABETH ALEXANDRA Place of Birth MAYFAIR, LONDON
Bynames.........                     Date  of Death
Sex,Status,Title F..M..Q.ELIZ.2      Place of Death

Titles            ELIZABETH II, QUEEN OF GT.BRITAIN
                                   AND NORTHERN IRELAND         1952
                  PRINCESS ELIZABETH                            1926

Popular name(s)
Notes             Queen Elizabeth has introduced a greater degree of
                  informality into royal occasions. The "walkabouts"
                  by herself and other members of the Royal Family
                  to meet the general public more closely are a
                  feature of her reign.

Card 86                     User Fields                     Page 3 of 3
CARD MENU - Enable/disable picture file          MODE MENU
```

Records from the demo file supplied with Ancestry





```
Galaxy Software - FAMILY HISTORY
(c) R.M.Kennedy 23 MAY 87 - MENU
Archimedes Version by Micro-Aid

C Convert Tree
E Easy Tree
F Easy File
G Gedcom  -    H elp
P Print Tree
* O.S.commands
ESCAPE to return to this menu

Press the key of your choice
or select by MOUSE
```

The Family History main menu

◄ *From Page 21*

Product: Family History System
Price: £20.52
Supplier: Micro Aid, Kildonan Courtyard, Barrhill, S. Ayrshire KA26 0PS.
Tel: 0465 82288

THIS package consists of a disc and a comb-bound 46 page manual in five sections on different coloured papers. The latter is rather unapproachable because there is no contents list or index, and the text tends to refer to the various programs by their filenames instead of their functions.

Although there is a tutorial section – again based on a Royal Family demonstration file, with more records than Ancestry but going back only to Queen Victoria – it deals with options alphabetically rather than systematically and is more a reference section than a tutorial.

For reasons which will become apparent we'll concentrate on the BBC Micro version, although an Archimedes one is available. On all machines Mode 7 is used to conserve memory and the maximum number of records that can be held in a file depends on your system. On an unexpanded BBC B it is 350 people and 100 partnerships, on an Archimedes the defaults are 2,750 and 750 respectively; other models have intermediate capacities.

On booting the disc you are presented with a menu showing the available options. The two main ones are Easy Tree and Print Tree, the former being where records are entered, maintained and examined, and the latter being for printing a genealogical chart in more or less standard format.

Selecting Easy Tree displays a new menu with 17 options. Adding and linking records can be done as you go along or, if you prefer, you can link them after entering a batch. The latter is a little more complicated because each one to be linked has first to be found by the search facility, which is simple but effective.

Children and multiple marriages should be linked in chronological order, though if you get it wrong you are allowed to reorganise the numbering later. Editing a linkage or adding a later child is rather a chore because you have to run through the whole family group first. Memory constraints limit the on-screen prompts during linking and sometimes to the absolutely minimal, if not downright cryptic.

Each record can include a remark of up to 240 characters to give information supplementing the bare forenames, surname, date of birth and date of death entries. The entry of dates is more flexible than in Ancestry, allowing days or months to be omitted, and it assumes dates to be after 1899 if only two digits are entered for the year. Unusual and interesting is the ability to use months 13, 14 and 15 for January, February and March in years before 1752, when the calendar was changed.

The browse option allows you to move around the records by selecting successive relatives – like father, mother, child or spouse – and the descendancy from the original subject is indicated by indention. The program-generated messages are not always helpful and the formatting of entries leaves something to be desired.

Various options are available for selective reports – show ancestors, show descendants, trace a line of descent – and reports can be sent to screen disc or printer. The width and style of printout can be set up as desired in advance, as can the indention of successive generations.

The other main program, Print Tree, prints out a genealogical chart using the width of the paper for the generations with the oldest to the right. Certain calculations are needed beforehand and if the tree has to be printed in strips there is no guarantee they will line up.

Other programs are provided to convert the data into an international format used by the Mormons in their huge genealogical undertaking and into other formats more convenient for sorting.

Now a few words on the Archimedes version, which really can't be recommended. It starts with an invitation to use the mouse, but the absence of a pointer makes this a fatuous gesture. Later a black pointer appears which merely obscures text and cannot be used. During browsing a *subscript out of range* error occurs intermittently.

This version bears all the signs of a hasty conversion and makes no serious attempt to use the machine's extra facilities other than the larger memory. The main program in the Family History System is 11.5k long – compare that with the massive 153k Ancestry main program.

THE JURY RETURNS

If you have an Archimedes and are keenly interested in genealogy you must buy Minerva's Ancestry program. It is powerful, graphic and above all, friendly. It was approachable enough for my wife, a noted computerphobe, to insist that she enter her own family details. This she did with minimal tuition and without reference to the manual. Full marks to Minerva.

In comparison the Archimedes version of the Family History System is something of a disaster, with flaws that render it unreliable and frustrating. On the other hand, the BBC B version is competent, if uninspiring, and is suitable for hobbyists.

SOFTWARE Bargains

AMAZING OFFER!

ELECTRON

Adventure
Business Games
Chess (Acornsoft)
Complete Cocktail Maker
Cybertron Mission
Escape Moonbase
Felix Fruit
Galactic Commander
Killer Gorilla
Positron
Stock Car
Swoop
Where?
Magic Mushrooms
Watch Your Weight
Tempest
Gyroscope
Bumble Bee
Chess (Micro Power)
Chess (Superior)
Croaker
Danger UXB
Felix Evil Weevils
Frenzy
Ghouls
Moonraider
Rubble Trouble
Swag
The Mine
Hopper
Deathstar
Draughts
Bandits at 3 O'Clock
Invaders
Stranded
Ele Invaders
Felix Factory
Gauntlet
Jet Power Jack
Boxer
Snapper

EDUCATIONAL

Desk Diary
Graphs & Charts
Workshop
Talkback
English
Maths O Level 2
Biology
Linkword Spanish
Linkword Italian
Turtle Graphics
Music Quiz
Science Fiction Quiz
Theatre Quiz
The Dating Game
Draw

ELECTRON

BBC

Bandits at 3 O'Clock
Business Games
Stranded
Felix Factory
Wizards Challenge
Killer Gorilla
Positron
Stock Car
Swoop
Star Fleet Encounter
Watch Your Weight
Gyroscope
Bumble Bee
Barrage
Complete Cocktail Maker
Cybertron Mission
Felix Fruit
Ghouls
Moonraider
Rubble Trouble
Swag
The Mine
Hopper
Deathstar
Invaders
Repton 1
Croaker
Escape Moonbase
Frenzy
Intergalactic Trader
Boxer
Snapper

EDUCATIONAL

Junior Maths
European Knowledge
World Geography
Which Salt
English
Maths O Level 2
Biology
Linkword Spanish
Linkword Italian
Draw
Music Quiz
Science Fiction Quiz
Theatre Quiz
The Dating Game
Fatman Sam
Star Drifter
Micro Cosm

BBC

Please give 2 additional choices, in case of non-availability

ANY 10 FOR ONLY £9.95!

(CASSETTE ONLY)

EDUCATIONAL

BEST FOUR LANGUAGE PROGRAMS

(PODD, WORDS WORDS WORDS, HIDE & SEEK, FACE MAKER)

BEST FOUR MATHS PROGRAMS

(NUMBER PAINTER, TABLE ADVENTURES, NUMBER PUZZLER, SQUEEZE)

RRP£28.75

OFFER £24.95 (per set)

(BBC 5.25" OR 3.5" DISCS ONLY)

or BUY BOTH for ONLY £44.95!

FUN SCHOOL 2

UNDER 6's Includes 8 programs. From counting Teddies through spelling and guessing games, children are encouraged to master the likes of numeracy, literacy and concentration.

6-8 YEARS The programs are devised to provide various levels of difficulty from words and numbers to co-ordination and logical thinking.

OVER 8's Older children face the challenge of an adventure game combined with a series of short puzzles. Seven of the programs are self contained but each of these has to be solved before the eighth title can be tackled

(Per level)	RRP	OFFER
BBC/Electron Cass	9.95	7.95
BBC Disc (state 40 or 80T)	12.95	9.95

INTEGRATED OFFICE SUITE

TITLE	F	RRP	SALE
Mini Office (BBC or Ele)	C	5.95	4.75
Mini Office II	C	14.95	11.95
Mini Office II 40t	D	16.95	13.95
Mini Office II 80t	D	16.95	13.95
Mini Office II M40t	D	19.95	15.95
Mini Office II M80t	D	19.95	15.95
Mini Office II Compact		21.95	17.95

JOYSTICKS AT LOW PRICES

ELECTRON JOYSTICK INTERFACE & SOFTWARE **£14.95**
QUICKSHOT II TURBO JOYSTICK **£13.95**
BUY BOTH £24.95!

VOLTMACE DELTA 3B TWINS
~~£24.95~~ **£19.95**
For use with Plus 1 or BBC

VOLTMACE 14B HANDSET **£15.95**
INTERFACE FOR 14B **£14.95**
BUY BOTH £27.95!

VOLTMACE DELTA 3B SINGLE **£13.95**

COMPETITION PRO **£19.95**

VOLTMACE DELTA 3S **£12.95**
(for Master Compact)

MASTERMIND QUIZ GAME

ONLY £6.95

Additional questions on

QUIZ MASTER

ONLY £4.95

(BBC/ELECTRON CASS ONLY)

BUY BOTH £9.95!

ELECTRON SPECIALS

VIEW ROM CART	£14.95
VIEWSHEET	£14.95
BUY BOTH	**£21.95**
LOGO (CART)	£24.95
LISP (CART)	£9.95
TURTLE GRAPHICS (CASS)	£2.95
BUY ALL 3	**£19.95**
MAINS ADAPTOR	**£9.95**

RECENT RELEASES AT SPECIAL PRICES

	BBC or ELE	BBC Disc	BBC Comp.
Acornsoft Hits 1	4.95	8.95	10.95
Acornsoft Hits 2	4.95	8.95	10.95
A Question of Sport	9.50	10.95	14.95
Barbarian	6.95	8.95	10.95
Barbarian 2	6.95	8.95	10.95
Blood of the Mutineers	6.95	8.95	–
Breakthrough	6.95	8.95	10.95
By Fair Means or Foul	6.95	8.95	10.95
Circus Games	6.95	8.95	10.95
Exile	9.50	10.95	14.95
Infinity	6.95	11.50	–
Ingrids Back	–	11.50	–
Kourtyard	6.95	8.95	–
Lancelot (80+ only)	–	11.50	–
Life of Repton	5.25	5.95	6.95
Living Daylights	–	8.95	–
Phantom	5.25	9.95	–
Pipeline	6.95	8.95	10.95
Play it Again Sam	6.95	8.95	10.95
Play it Again Sam 2	6.95	8.95	10.95
Play it Again Sam 3	6.95	8.95	10.95
Play it Again Sam 4	6.95	8.95	10.95
Play it Again Sam 5	6.95	8.95	10.95
Play it Again Sam 6	6.95	8.95	10.95
Play it Again Sam 7	6.95	8.95	10.95
Play it Again Sam 8	6.95	8.95	10.95
Repton Infinity	9.50	10.95	14.95
Skirmish	6.95	8.95	–
Spy Cat	6.95	8.95	10.95
Spy vs Spy	6.95	8.95	10.95
Superman	6.95	8.95	10.95
Superior Collection 1	6.95	8.95	10.95
Superior Collection 2	6.95	8.95	10.95
Superior Collection 3 (Ele)	6.95	8.95	10.95
Tank Attack	9.50	10.95	14.95
The Last Ninja	6.95	8.95	10.95
Time & Magik	–	11.50	–

DESKTOP PUBLISHING

TITLE	F	RRP	SALE
Admin Extra (40T)	D	14.95	11.95
Admin Extra (80T)	D	14.95	11.95
Fleet St Editor (40T)	D	39.95	29.95
Fleet St Editor (80T)	D	39.95	29.95
Fleet St Editor Compact		44.95	39.95
Fonts & Graphics 4	D	14.95	11.95
Fonts & Graphics 8	D	14.95	11.95
Stop Press (Mas)	D+R	49.95	41.95
Stop Press (B/B+)	D+R	49.95	41.95
Walt Disney (40T)	D	14.95	11.95
Walt Disney (80T)	D	14.95	11.95

Archimedes

	R.R.P.	Offer Price
1st Word Plus	~~£91.94~~	£84.95
Alerion	~~£14.95~~	£12.95
Alpha Base	~~£49.95~~	£44.95
Ansi C	~~£113.85~~	£99.95
Arcade 3 Compilation	~~£14.95~~	£11.95
Arcendium	~~£14.95~~	£11.95
Archimedes Dust Cover	—	£14.95
Archimedes Ref. Manual	—	£29.95
Arctist	~~£19.95~~	£17.95
Arc Trivia	~~£24.95~~	£19.95
Arc – PCB	~~£195.50~~	£189.95
Artisan Support Disk	~~£19.95~~	£17.95
Artisan	~~£39.95~~	£34.95
Autosketch	~~£90.85~~	£79.95
Creations Disk	~~£19.95~~	£15.95
Conqueror	~~£24.95~~	£19.95
Corruption (New!)	~~£24.95~~	£19.95
Deltabase	~~£29.95~~	£25.95
Desk Top Enhancer	~~£29.95~~	£24.95
Enthar Seven	~~£29.95~~	£24.95
Euclid	~~£45.00~~	£39.95
Fireball (New!)	~~£19.95~~	£13.95
Fish (New!)	~~£24.99~~	£19.95
Flying Start 2	~~£99.95~~	£89.95
Fortran 77	~~£113.85~~	£99.95
Fugitives Quest	~~£29.95~~	£24.95
Freddy's Folly (New!)	~~£14.95~~	£11.95
Gama Plot	~~£69.95~~	£59.95
Graphic Writer	~~£29.95~~	£24.95
Hearsay	~~£69.99~~	£59.95
Hoverbod	~~£14.95~~	£11.95
Home Accounts	~~£49.95~~	£44.95
ISO Pascal	~~£113.85~~	£99.95
Jet Fighter	~~£14.95~~	£11.95
Logistix	~~£113.85~~	£99.95
Minotaur	~~£14.95~~	£11.95
Missile Control	~~£14.95~~	£11.95
Nominal Ledger	~~£64.95~~	£54.95
Order Processing/Invoicing	~~£64.95~~	£54.95
Orion (New!)	~~£14.95~~	£11.95
Overload	~~£14.95~~	£11.95
Pac Mania	~~£19.95~~	£17.95
PC Emulator	~~£113.85~~	£113.85
Personal Accountant	~~£279.99~~	£249.95
Pipedream	~~£113.85~~	£99.95
Presenter	~~£28.69~~	£24.95
Pro Artisan	~~£169.95~~	£154.95
Purchase Ledger	~~£64.95~~	£54.95
Quazer	~~£11.95~~	£9.95
Render Bender	~~£79.95~~	£69.95
Repton 3	~~£19.95~~	£17.95
Rise in Crime	~~£29.95~~	£24.95
Sales Ledger	~~£64.95~~	£54.95
School Administrator	~~£79.95~~	£69.95
Sigma Sheet	~~£69.95~~	£59.95
Sound Synth	~~£49.95~~	£44.95
Star Trader	~~£17.95~~	£15.95
Stock Management	~~£64.95~~	£54.95
Super Dump	~~£24.95~~	£21.95
System Delta Plus	~~£69.95~~	£59.95
Terramex	~~£19.95~~	£17.95
Thundermonk	~~£14.95~~	£11.95
Toolkit Module	~~£39.95~~	£34.95
Toolkit Plus	~~£39.95~~	£34.95
Twin	~~£33.35~~	£29.95
U-Connect	~~£59.95~~	£49.95
View 3	~~£59.80~~	£49.95
Wordwise +	~~£23.00~~	£19.95
Word Up Word Down	~~£17.95~~	£15.95
Zarch	~~£19.95~~	£17.95

- **Please add 95p P&P (Overseas £4.50).**
- **All prices include VAT**
- **Goods despatched within 48 hours – subject to availability**
- **Out of hours answerphone; 0532 436300**

SOFTWARE Bargains
Dept. MU69, c/o Northwood House
North Street, Leeds LS7 2AA
Tel: 0532 436300

MAIL ORDER ONLY

We can offer attractive discounts for all educational establishments, phone or write for a quote.

We supply a catalogue of our entire stock range per machine type with every order.

B B+ M

Time for beginners?

Mad Hatter reveals some secrets of an old classic

I AM noted for my restraint. A few months ago I was about to feature one of my favourite older games when it was rereleased in enhanced form for the expanded BBC Micro. I felt that to reveal it then would spoil the enjoyment of a great many people, so I held back. Thus only now can we take a filleting knife to the Level 9/Mandarin classic Lords of Time from the Time and Magik trilogy.

This adventure has produced a tremendous number of letters of inquiry over the years. It is divided into nine parts – identified as time zones – and while each provides a modest adventure in itself, there has to be quite a lot of movement between them if the game is to be completed.

A number of readers made the mistake of assuming that each part was self-contained and this turns out to be the main reason why some of you made so little progress. So here we go – all will be revealed in Time.

The adventure starts with you sitting at home when there is a blinding flash. If you then LOOK, a fuller description shows you to be in a living room, with an hourglass and a picture of Old Father Time. You are told that the former is a treasure and there are *nine* items marked with the hourglass symbol which you must collect. Although the hourglass sands have almost run through I found no indication that a move counter was at work.

Moving N from the sitting room takes you into a cold looking room where there is a grandfather clock, a matchbox and a candle. This is also where the only bug I've found occurs – the *Matches* were actually described as *'tches*. But

Tips for the elite

Elite, that fascinating game that is achieving cult status, continues to draw a large postbag full of hints, tips and queries. Daniel Wagenaar and Steven de Rooy from Amsterdam offer a very useful tip that had me kicking myself over the time wasted on bounty hunts.

Established devotees will know that I advocated working between Vezaaes and Biabite, building up credits and kills until it was time for the second mission. It entails launching from Biabite, leaving the safe zone and then hunting for bandits. It takes a minute or two to get clear of the safe zone, and I usually read a book.

These bright lads came up with the following scheme which is far superior to mine, daft old codger that I am: Find *three* planets within the seven light year radius, where one is poor agricultural, another is rich industrial and the third's economic status is of no importance. Three perfect systems in Galaxy Two are Quedle, Recexela and Erreenen.

Buy computers from the rich industrial system as usual and take them to the poor agricultural world. Refuel there, but don't buy anything – instead, on launching, hyperspace to the third system and use the jump facility in deep space to hunt pirates and collect cargo. When you have enough, hyperspace again to your true destination, sell your cargo, refit as necessary and repeat the process. It's much quicker.

They also include a useful little printer dump utility that gives the details of each planet in a galaxy. It works only on the Master version. Start in Mode 7 and load the game as usual, use f4 to show the galaxy of which you want details, press Control+Break then execute the following short program:

```
10 ?&FE34=7
20 FOR T%=0 TO 31:FOR S%=0 TO 508 STEP4
30 !(&3000+T%*640+S%)=!(&4000+T%*512+S%)
40 NEXT:*SAVE screen 3000+8000
```

Martin Cartwright has an interesting point and a couple of queries. He says that in the old version of Elite most Anacondas carry Worms and release them when hit.

He's still hunting Asteroids – and not finding them – but I can only encourage him to persevere and remember they are subject to random generation. They usually turn up one at a time rather than in groups, though on my second processor don't be put off by it.

It is worth pausing here for a moment: Newcomers to the genre should note that the early locations in any good adventure game provide valuable clues and equipment for use later on. We know the essence of the task – to collect nine marked items.

The second room provides more clues still and a puzzle. Opening the matchbox reveals four matches which are clearly sources of light or heat. But by their very nature they will have only a *limited* effect: They won't last many moves once lit. The candle on the other hand, can be expected to provide a longer lasting – though still limited – light source. The presence of these items means that we can be sure that some of the adventure will take place in the dark or underground.

The main early puzzle lies in the clock. Here, beginners should notice that it is vital to experiment when confronted with strange objects or situations. First, however, you must save your position.

Whenever you face something potentially dangerous always save first. Then you can experiment to your heart's content – if you get killed as a result, it doesn't matter because you can always load or restore the position saved. Even if you were killed you will have learnt something valuable providing you remembered to make notes.

So there we are faced with the clock: Enter WIND CLOCK and the door opens, so you need to go IN. Inside the clock are nine numbered cogs and a massive pendulum. As an example of experimenting you can TURN COG but nothing amazing happens so SWING PENDULUM – which proves to be what's needed to get into the main game.

I'll continue this treatment next month, but with new people particularly in mind. Regular adventurers please be patient – after all *you* were a beginner once.

Hatter's Helpline

James Harwood's problem in **Time Machine** was answered by Dallas Simpson. He tells me that getting out of the moors is the first problem to solve and suggests wandering in a generally northward direction for a while – such as N,E,N,W and then go S after the westward move.

James should now see a house to the north and head for it. After that, it is a matter of getting and wearing the gloves, locating a window and smashing it in order to enter the house.

Dallas is stuck further on in the adventure – having problems with a brontosaurus. The answer is to feed it with biscuits and then he'll be able to approach the lake.

Thomas Womack is having a number of problems with that difficult and demanding adventure **Oxbridge**.

In the Punter's Arms the procedure is as follows: SAY COURAGE – as the message on the wall indicates – the troll will then produce the EXEAT hint and the tankard. TAKE TANKARD, DRINK TANKARD and then this coin will drop to the ground and can be taken. Since the landlord doesn't appreciate having his beer mugs nicked, Thomas must now DROP TANKARD and he can then leave the pub safely with the coin.

Thomas also has problems with the lift in Harrids. This sneaky – and that's a compliment – problem has to be solved in the following manner: Take the hat and the scarf to the west end of the building on the same floor.

Now press the button to summon the lift, open the doors, enter the lift and drop both objects. Leave the lift at this point, close the doors, go to the ground floor via the staircase and summon

Turn to Page 26 ▶

version they do occasionally appear in pairs.

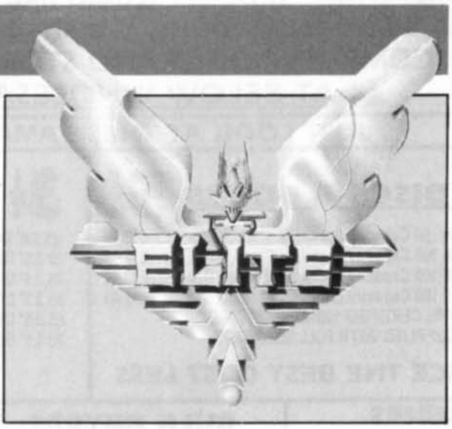
Lastly he appeals for precise details of where in Galaxy Four the generation ships appear. I can't help, since my searches have so far proved fruitless. Can a reader please supply details which include the version of the program used and the nearest planetary systems?

Peter Phipps has the second processor version and offers a tip together with some information. High quantities of platinum can safely be sold if done in lots of 50Kg rather than attempting to sell the whole lot at once.

He also writes: I have twice encountered coronet-shaped ships which are not in the manual. They seem impervious to energy bombs and behave rather like Constrictors, soaking up laser fire and launching four missiles before succumbing.

He hasn't found generation ships either – perhaps these coronets are what the second processor version has instead?

Mikail Quinlan adds another rumour to his earlier one of the targeting computer. He suggests that when Elite, with a further seven Right on Commander! credits, you are invited to join a posse of police and bounty hunters to destroy a



fleet of 100 pirate Pythons in Galaxy Eight. Sounds a bit far-fetched to me.

Can readers sending in Elite information always state the version of the game and hardware configuration they are using, plus as much detail concerning the galaxy they are in and the nearest planetary system? This will help us to amass an interesting body of data, though I now receive so many letters on the game that I must ration space in the column.

◀ *From Page 25*

the lift by pressing the button. The hat and scarf can now be retrieved safely.

In the fishmongers all Thomas needs to do is to OPEN OYSTER – and there's a pearl to be found.

The garden maze is a direct implementation of the classic Knight's Tour chess problem. Each square must be visited once and once only, ending on the square from which you started, hence there are many possible solutions. I suggest Thomas works one out on a piece of paper first.

If anyone is in the dark so far as **The Labyrinths of LaCoshe** or **Kingdom of Hamil** are concerned the way to get illuminated is simply to enter the single command ON when possessing the lamp. How I wish those early adventures had all agreed on a simple two word convention such as LIGHT LAMP.

Jeffrey Huckle is a very frustrated adventurer, probably because he hasn't written down all the AZAP codes in **Kayleth**. They are: ROO DHT ELY AKN EPO – read backwards they provide the password for opening the iris door.

Jonathan Fenton has some queries from **The Ket Trilogy**. He wants to know how to kill the dragon in *The Mountains of Ket*: The answer is not to try – it's unkillable. Instead, head north to the large dragon's den and collect the bracelet and then beat a hasty retreat south a few times. It's best to save the moment you have killed the ogre in case the dragon polishes you off.

In *The Temple of Vran* the quicksand pit is crossed by tying the vine to the cane, firing the bow and swinging across. If he then drops everything and proceeds north, he'll meet someone delectable.

Lastly, he asks how to kill the slime in the final part of the trilogy: As with the dragon, the answer is not to try – it's not even necessary to visit the slime room to complete the adventure successfully.

— SPECIAL OFFER — SPECIAL OFFER — SPECIAL OFFER — SPECIAL OFFER —

PUBLIC APOLOGY

We at M.D. Office Supplies would like to take this opportunity to apologise to all its competitors. We shall with immediate effect supply, COMPUTER DISCS AND STORAGE BOXES ETC., AT BELOW WHOLESALE PRICES

JUST LOOK AT THESE AMAZING OFFERS

5¼ 5.25" DISCS & BOXES 5¼

25 5.25" DS-DD 96 TPI with 50 Capacity Lockable Storage Box	£12.49
50 5.25" DS-DD 96 TPI with 100 Capacity Lockable Storage Box	£18.49
75 5.25" DS-DD 96 TPI with 100 Capacity Lockable Storage Box	£23.49
100 5.25" DS-DD 96 TPI with 100 Capacity Lockable Storage Box	£29.49

ALL DISCS ARE CERTIFIED 100% ERROR FREE,
AND ARE SUPPLIED WITH FULL USER SETS

AT M.D. OFFICE THE BEST COST LESS

3½ 3.5" DISCS & BOXES 3½

25 3.5" DS-DD 135 TPI with 40 Capacity Lockable Storage Box	£22.95
35 3.5" DS-DD 135 TPI with 80 Capacity Lockable Storage Box	£31.95
45 3.5" DS-DD 135 TPI with 80 Capacity Lockable Storage Box	£37.95
55 3.5" DS-DD 135 TPI with 80 Capacity Lockable Storage Box	£44.95
65 3.5" DS-DD 135 TPI with 80 Capacity Lockable Storage Box	£49.95
75 3.5" DS-DD 135 TPI with 80 Capacity Lockable Storage Box	£54.95

ALL DISCS ARE CERTIFIED 100% ERROR FREE,
AND ARE SUPPLIED WITH LABELS

ACCESSORIES

3.5" 40 Capacity lockable box	£5.95
3.5" 80 Capacity lockable box	£6.95
3.5" Disk Drive cleaning kit (Only if order with other goods)	£1.99
Mouse Mats	£2.49

BULK BUYERS

250 DSDD 5.25"	£69.99
500 DSDD 5.25"	£129.99
250 DSDD 3.5"	£177.50
350 DSDD 3.5"	£241.50

PRICE AND QUALITY GUARANTEE

All our Discs are top quality products and are certified 100% error free. Should you ever see a comparable product advertised in this magazine at a lower price we will not match it we will BEAT IT GUARANTEED

VISA

M.D. OFFICE SUPPLIES
18 CRESCENT WAY, FARNBOROUGH, KENT BR6 9LS
TELESALES HOTLINES: 0689-61400

Access

All prices include VAT and Delivery UK only

Supplied subject to availability. E/OE

— SPECIAL OFFER — SPECIAL OFFER — SPECIAL OFFER — SPECIAL OFFER —

Clock that slowcoach

Paul Fagan shows how you can take the brakes off all your programs

IT is sometimes useful to know what parts of a program your BBC Micro is spending the most time on, either to identify a bug or to find out what areas need to be optimised to run faster. The Timer Debug utility allows you to isolate three areas of a program and provides a statistical output of how long it spent in each. By a process of elimination you can track down the time-consuming regions.

The obvious way to analyse a program is to use one of the VIA timers to interrupt it at fixed intervals and examine the Basic pointers to find out what line is currently being processed. But three problems arise with this approach.

The first is the problem of load: Adding another, say, 100Hz interrupt to the system is going to slow it down and we want the software to run at almost the right speed. We can get around this by simply piggy-backing our routine on to the existing 100Hz VIA Timer 1 interrupt which is used to tick the system clock.

The second difficulty involves accessing line numbers. BBC Basic does not deal with them very much and doesn't store the current one, so there's no simple way of finding out where execution currently is. This problem is solved by a bit of *dirty* programming involving a Basic rom routine that finds lines for the GOTO, GOSUB and RESTORE commands. It would be fairly easy to write a routine to scan the current program for line numbers to make the utility completely legal.

This function expects a line number in four bytes starting at &2A. If it's found, carry is clear and returns the address of the line length byte in &3D and &3E. When the line isn't found, carry is set and the pointer indicates the terminating Return character of the highest line below that supplied.

By using this routine we can find the addresses of the start and end of the line number blocks and then compare them with the contents of the current line pointer in &0B and &0C – which is reasonably quick.

The final difficulty has to do with the sampling rate – we have to ensure that we do one sample per line, which means operating at a high frequency. But this brings us back to the speed problem. The program given here replaces the original value of the Timer 1 high order latch with a lower value.

A more sophisticated version could cycle through a table of values causing the sampling to jitter to ensure complete line coverage. A point to bear in mind here is that we are messing around with the system clock timing, so strange things may happen to the keyboard repeat frequencies and other time-dependent functions.

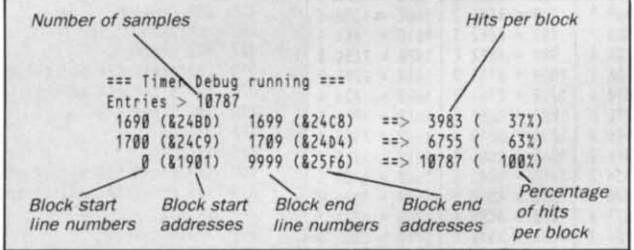
The program consists of three routines – START, FINISH and INTRPT. The first initialises the data areas, switches on the interrupt processing and finds the addresses of the required line number blocks. The second resets the vector and clears the *ACTIVE* flag and replaces the original value of the Timer 1 high order latch.

The actual processing routine – *INTRPT* – only operates if the flag *ACTIVE* is non-zero which lets you temporarily switch it off around INPUT statements. Then it checks that the right sort of interrupt has occurred and, if so, checks the current pointer to see if it lies between any of the line blocks. Where a hit has occurred the relevant counter is incremented.

The program given here contains the machine code for the Debug utility plus a test program to show how it is used. To employ it incorporate the line numbers you want to test in the code and assemble it to some safe area of memory.

Alter your program to include a call to the start and finish addresses at the appropriate places, then you can extract the data as shown in the demo program. If you have an INPUT or GET statement you'll need to poke the *ACTIVE* flag with zero just before it and a non-zero value after.

Now you can add this excellent utility to your armoury of debugging software and find out where your programs are going slow.



```
=== Timer Debug running ===
Entries > 10787
 1690 (&24BD)   1699 (&24C8)   ==>  3983 (   37%)
 1700 (&24C9)   1709 (&24D4)   ==>  6755 (   63%)
    0 (&1901)   9999 (&25F6)   ==> 10787 (  100%)
```

Sample output from program

```
 10 REM Timer Debug
 20 REM by Peter Fagan
 30 REM (c) The Micro User
 40 MODE 3
 50 PROCinit
 60 PROCass'em
 70 PROCtest
 80 PROCsave
 90 END
100 DEFPROCinit
110 code    =&900
120 sysvia  =&FE40
130 ifr     =sysvia + 13
140 t1lh    =sysvia + 7
150 oldacc  =&FC
160 irq1v   =&0204
170 linptr  =&000B
180 REM Basic I  > &9942 B
190 REM Basic II > &9970 B or B+
200 REM Basic IV > &???? Master
210 REM Basic VI > &???? Compact
220 linsrch =&9970
230 inta    =&002A
240 ptr     =&003D
250 delay   =&03
260 range1lo= 1690
270 range1hi= 1699
280 range2lo= 1700
```

Turn to Page 28 ➤

Get it right!

```
  10 =    0 0
  20 =    0 0
  30 =    0 0
  40 = 5016 6
  50 = DEBB 7
  60 = B854 3
  70 = E0D3 A
  80 = 90DB 7
  90 = FD2E 4
 100 = 344C D
 110 = FC4A 1
 120 = 957D 7
 130 = 2BC9 E
 140 = 1D46 1
 150 = A56C A
 160 = 23B7 9
 170 = ABEC D
 180 =    0 D
 190 =    0 D
 200 =    0 D
 210 =    0 D
 220 = 5ADA C
 230 = 97BE 7
 240 = A25D 5
 250 = FE19 9
 260 = 2E3D 0
 270 = 115C F
 280 = 8ED1 5
 290 = B1B0 8
 300 = CD61 D
 310 = 7EC9 0
 320 = ED0F 2
 330 = 1330 9
 340 = AAB9 5
 350 = 7CBB 2
 360 = 3208 8
 370 = 6106 D
 380 = 4210 4
 390 = 28FE C
 400 = 194E A
 410 = F0FF 2
 420 = D336 2
 430 = E020 9
 440 = 76F7 4
 450 = 26BF 7
 460 = 4E69 5
 470 = 9ADE E
 480 = 4C9A 4
 490 = BCB3 C
 500 =  325 F
 510 = ADB7 D
 520 = 9511 C
 530 = CC9B 4
 540 = D86D 7
 550 = A675 0
 560 = 777B 1
 570 = 3122 8
 580 = 2103 1
 590 = AF48 1
 600 = C408 3
 610 = 6E12 7
 620 = 5C6A E
 630 =  330 B
 640 = B43F 9
 650 = 74FB 6
 660 = 3B84 E
 670 = CF90 8
 680 = C1CC 6
 690 = 661F 0
 700 = 8D00 2
 710 = 3C94 7
 720 = 2BA5 B
 730 = BB0D 0
 740 = 74FB 1
 750 = 27D6 9
 760 = E174 E
 770 = 6E12 0
 780 = 5C6A 2
 790 =  330 9
 800 = E659 1
 810 = FEB9 3
 820 = 6775 6
 830 = 8212 2
 840 = 3479 2
 850 = 8D00 D
 860 = FC08 0
 870 = 45C5 3
 880 = 9CCF 5
 890 = FBC8 7
 900 = 595D C
 910 = 9843 F
 920 = 9556 3
 930 = CE24 2
 940 = 402F 2
 950 = 655E 5
 960 = 402F 5
 970 = 6F84 2
 980 = 86E2 3
 990 = 95E2 E
1000 = 6311 9
1010 = E139 5
1020 = BB6E 5
1030 = B81B B
1040 = BD84 0
1050 = C265 E
1060 = ABF8 B
1070 = BCB3 A
1080 = 1536 D
1090 = ADB7 3
1100 = 9511 E
1110 = 8D00 F
1120 = D534 9
1130 = F74C A
1140 = 606B 3
1150 = C07C 2
1160 = E4AC B
1170 = E547 A
1180 = C23D 9
1190 = D277 4
1200 = 6BA6 9
1210 = E4AC 9
1220 = 649F 6
1230 = 67EA 9
1240 = 6275 B
1250 = 69C3 8
1260 = F3EC 6
1270 = 5C17 2
1280 = DC83 0
1290 = 5549 C
1300 = B776 3
1310 = 7D95 5
1320 = D0D1 A
1330 = 71F1 6
1340 =  951 F
1350 = F0FF D
1360 = 4333 2
1370 = 9CB7 9
1380 = C9DE 8
1390 = 4257 4
1400 = B7B8 8
1410 = 1517 E
1420 = 6371 B
1430 = 8ECB 7
1440 = F8AD 5
1450 = F87F B
1460 = 8E19 6
1470 = 4590 4
1480 = BD48 7
1490 = BD48 5
1500 = BD48 2
1510 = 7433 E
1520 = BD48 5
1530 = F261 6
1540 = F88F E
1550 = F88F 0
1560 = F88F A
1570 = 102E B
1580 = AAD9 7
1590 = 152B B
1600 = 953B 5
1610 =  D4A 1
1620 = 7C5C 0
1630 = E8F5 2
1640 =  A24 4
1650 = 976A 3
1660 = 7502 9
1670 = 52E0 3
1680 = D401 3
1690 = 1BE6 0
1700 = AE4D 7
1710 = C9D5 0
1720 = 3166 E
1730 = E188 7
1740 = 6639 B
1750 = 4657 F
1760 = 5C8D F
1770 = 2F1C 9
1780 = DDAE C
1790 = A250 C
1800 = 4C66 A
1810 = CE6D 7
1820 = C688 A
1830 =  C7D 5
1840 = E531 D
1850 =  EB7 9
1860 = FC92 7
1870 = 413C 4
1880 = ED0F 7
```

◀ From Page 27

```
290 range2hi= 1709
300 range3lo=    0
310 range3hi= 9999
320 ENDPROC
330 DEFPROCassem
340 FOR L%=0 TO 2 STEP 2
350 P%=code:[OPT L%
360 .start
370  LDX #&1C:LDA #&00
380 .clear
390  STA counts,X
400  DEX:BPL clear
410  PHP:SEI
420  LDA irq1v+0:STA oldv+1
430  LDA irq1v+1:STA oldv+2
440  LDA #intrpt MOD256:STA irq1v+0
450  LDA #intrpt DIV256:STA irq1v+1
460  LDA t1lh:STA oldt1l
470  LDA #delay:STA t1lh
480  PLP
490  LDY #2
500 .loop
510  TYA:ASL A
520  ASL A:TAX
530  LDA lines+2,X
540  ORA lines+3,X
550  BEQ repeat
560  LDA #&00
570  STA inta+2
580  STA inta+3
590  LDA lines+0,X:STA inta+0
600  LDA lines+1,X:STA inta+1
610  TYA:PHA
620  JSR linsrch
630  PLA:TAY
640  BCC lfound
650  CLC
660  LDA ptr+0:ADC #1:STA addrs+0,X
670  LDA ptr+1:ADC #0:STA addrs+1,X
680  JMP upper
690 .lfound
700  SEC
710  LDA ptr+0:SBC #2:STA addrs+0,X
720  LDA ptr+1:SBC #0:STA addrs+1,X
730 .upper
740  CLC
750  LDA lines+2,X:ADC #1:STA inta+0
760  LDA lines+3,X:ADC #0:STA inta+1
770  TYA:PHA
780  JSR linsrch
790  PLA:TAY
800  BCC ufound
810  LDA ptr+0:STA addrs+2,X
820  LDA ptr+1:STA addrs+3,X
830  JMP repeat
840 .ufound
850  SEC
860  LDA ptr+0:SBC #3:STA addrs+2,X
870  LDA ptr+1:SBC #0:STA addrs+3,X
880 .repeat
890  DEY:BPL loop
900  DEC active
910  RTS
920 .intrpt
930  BIT ifr
940  BPL oldv
950  BIT active
960  BPL oldv
970  LDA oldacc:PHA
980  TXA:PHA:TYA:PHA
990  LDA ifr
1000  ASL A
1010  BPL exit
1020  INC entries+0:BNE getlin
1030  INC entries+1:BNE getlin
1040  INC entries+2:BNE getlin
1050  INC entries+3
1060 .getlin
1070  LDY #2
1080 .rpt
1090  TYA:ASL A
1100  ASL A:TAX
1110  SEC
1120  LDA linptr
1130  SBC addrs+0,X
1140  LDA linptr+1
1150  SBC addrs+1,X
1160  BCC next
1170  LDA addrs+2,X
1180  SBC linptr
1190  LDA addrs+3,X
1200  SBC linptr+1
1210  BCC next
1220  INC counts+0,X:BNE next
1230  INC counts+1,X:BNE next
1240  INC counts+2,X:BNE next
1250  INC counts+3,X
1260 .next
1270  DEY:BPL rpt
1280 .exit
1290  PLA:TAY:PLA:TAX
1300  PLA:STA oldacc
1310 .oldv
1320  JMP &0000
1330 .finish
1340  LDA #0:STA active
1350  PHP:SEI
1360  LDA oldv+1:STA irq1v+0
1370  LDA oldv+2:STA irq1v+1
1380  LDA oldt1l:STA t1lh
1390  PLP:RTS
1400 .lines
1410  OPT FNw(range1lo)
1420  OPT FNw(range1hi)
1430  OPT FNw(range2lo)
1440  OPT FNw(range2hi)
1450  OPT FNw(range3lo)
1460  OPT FNw(range3hi)
1470 .counts
1480  OPT FNd(0)
1490  OPT FNd(0)
1500  OPT FNd(0)
1510 .entries
1520  OPT FNd(0)
1530 .addrs
1540  OPT FNw(0):OPT FNw(0)
1550  OPT FNw(0):OPT FNw(0)
1560  OPT FNw(0):OPT FNw(0)
1570 .active OPT FNb(0)
1580 .oldt1l OPT FNb(0)
1590 .codeend
1600 ]:NEXT:ENDPROC
1610 DEFFNb(B%):?P%=B%:P%=P%+1:=L%
1620 DEFFNw(W%):!P%=W%:P%=P%+2:=L%
1630 DEFFNd(D%):!P%=D%:P%=P%+4:=L%
1640 DEFPROCtest
1650 PRINT"=== Timer Debug running ==="
1660 LOCAL @%:@%=&905
1670 CALL start
1680 FOR X%=1 TO 100
1690 A=SIN(0.6)
1700 A=COS(0.6)
1710 NEXT:CALL finish
1720 E%=!entries
1730 PRINT "Entries > "E%
1740 FOR X%=0 TO 2
1750 B%=lines+X%*4
1760 L%=B%!0AND&FFFF:U%=B%!2AND&FFFF
1770 B%=addrs+X%*4
1780 a1%=B%!0AND&FFFF:a2%=B%!2AND&FFFF
1790 C%=counts!(X%*4)
1800 P%=100*C%/E%+0.5
1810 PRINT L%" (&";~a1%")"SPC2;
1820 PRINT U%" (&";~a2%")"SPC3;
1830 PRINT "==> "C%" ("P%"%)"
1840 NEXT:ENDPROC
1850 DEF PROCsave
1860 PRINT"To save, copy this:"
1870 PRINTSPC1"*SAVE Tcode "STR$~code"
"STR$~codeend
1880 ENDPROC
```

Computers and Upgrades

Archimedes 305	£669.00 (a)
Archimedes 305 Mono System	£759.00 (a)
Archimedes 305 Colour System	£919.00 (a)
Archimedes 310	£899.00 (a)
Archimedes 310 Mono System	£959.00 (a)
Archimedes 310 Colour System	£1119.00 (a)
Archimedes 310M	£959.00 (a)
Archimedes 310M Mono System	£1179.00 (a)
Archimedes 310M Colour System	£1159.00 (a)
Archimedes 440	£2529.00 (a)
Archimedes 440 Mono System	£2589.00 (a)
Archimedes 440 Colour System	£2749.00 (a)

410/1 420/1 NOW AVAILABLE
Prices from £1199.00
Phone for details

Archimedes podule backplane	£39.00 (d)
Archimedes ROM podule	£59.00 (d)
Archimedes I/O podule	£85.00 (d)
Archimedes Midi add-on to I/O podule	£39.00 (e)
Archimedes Midi podule	£69.00 (d)
Master 128	£379.00 (a)
Master Compact	From £310.00 (a)
Master Turbo Upgrade	£110.00 (c)
Master 128 Eprom Cartridge	£11.00 (c)
Master 128 Dust Cover	£4.50 (e)
Compact RS 232 Interface	£26.00 (c)
Compact TV Modulator	£26.00 (e)
1770 Disc Interface	£45.00 (d)
ADFS ROM (B+ or B with 1770)	£25.00 (e)
B+64 64K Upgrade	£30.00 (d)
Trade in your old Model B against a new Master 128, Master Compact or Archimedes	
Cambridge Computers Z88	£244.00 (a)
Z88 PSU	£8.65 (d)
128K RAM	£43.00 (e)
128K Eprom	£43.00 (e)

ATARI & COMMODORE – Now available
Phone for latest offers

Printers (Dot Matrix)

Citizen 120D 80col/120cps + 25cps NLQ	£130.00 (a)
Citizen MSP15E 136col/160cps + 40cps NLQ	£230.00 (a)
Citizen MSP40 80col/200cps + 50cps NLQ	£300.00 (a)
Citizen MSP45 136col/200cps + 50cps NLQ	£390.00 (a)
Citizen MSP50 80col/250cps + 60cps NLQ	£390.00 (a)
Citizen MSP55 136col/250cps + 60cps NLQ	£515.00 (a)
Citizen HQP40 24pin 80col/200cps + 60cps LQ	£369.00 (a)
Citizen HQP45 24pin 136col/200cps + 60cps LQ Special	**£350.00 (a)**
Star LC10 120cps + 30cps NLQ	£199.00 (a)
Star ND10 80col/180cps + 45cps NLQ	£320.00 (a)
Star ND15 136col/180cps + 45cps NLQ	£380.00 (a)
Star NR10 80col/240cps + 60cps NLQ	£395.00 (a)
Star NR15 136col/240cps + 60cps NLQ	£460.00 (a)
Star LC24-10 80col/142cps + 47cps LQ 24pin	£305.00 (a)

Printers (Laser)

Citizen Overture 110- 10pages/min	£1390.00 (a)
Star Laser Printer 8 8 pages/min	£1700.00 (a)

All laser printers with1 year on site maintenance

AMX Mouse and Software

AMX Mouse + Super Art	£60.00 (d)
AMX Pagemaker	£37.00 (d)
Extra Extra	£21.00 (e)
Mouse Mat	£4.34 (e)

Disc Drives

Mitsubishi Drives

Single DS 40/80T	£96.00 (a)
Single DS 40/80T inc PSU	£111.00 (a)
Dual DS 40/80T	£189.00 (a)
Dual DS 40/80T inc PSU	£209.00 (a)
Dual DS 40/80T inc PSU & Plinth	£214.00 (a)
20Mb Winchester	£449.00 (a)
Combination 3.5 5.25 Winchester available	Phone for details

2 year Warranty on all Drives

B&S
COMPUTING

BUSINESS SYSTEMS • HARDWARE
SOFTWARE • VIDEO SYSTEMS
MEDIA SUPPLIES
OFFICIAL DOMESDAY DEALER
APPROVED ECONET DEALER

Acorn
The choice of experience

ACORN APPROVED DEALER

Phone 0602 787923

Discs

Discs 5.25" (Boxed in 10's Lifetime guarantee)

3M744 SS/DD 48TPI	£8.00 (d)
3M745 DS/DD 48TPI	£9.00 (d)
3M747 DS/DD 96TPI	£13.00 (d)
Add £1 for plastic library case	
B & S Label 96TPI in see through LIB. Case DS/DD	£10.00 (d)
Disc Cleaning Kit (state 5.25" or 3.5")	£5.00 (d)
3.5"	
3M 35SS SS/DD (Box of 10)	£13.00 (d)
3M 35DS DS/DD (Box of 10)	£16.00 (d)
B & S Label DS/DD	£13.00 (d)

Lockable Anti-Static 5.25" Storage Cases

50 Disc Capacity	£8.00 (d)
100 Disc Capacity	£10.00 (d)

Monitors

All Monitors include BBC Lead

BM 7502 (Green) Hi-Res Mono Monitor with Audio	£69.00 (a)
Philips Colour Monitor RGB, Composite Video, Audio in Linear RGB Green Screen SwitchableBBC/IBM Compatible CM8833	£220.00 (a)
Philips Multisync CM8873 CGA/EGA/PGA Compatible	£520.00 (a)
Ideal for use with Acorn Archimedes computers.	
Microvitec	
1431 (Metal or Plastic Case please specify) Std. Res.	£184.00 (a)
1451 (Metal or Plastic Case please specify) Med Res.	£229.00 (a)
1441 (Metal or Plastic Case please specify) High Res.	£379.00 (a)
1431 AP Metal Case RGB and CV/Audio Std. Res.	£209.00 (a)
1451 AP Metal Case only RGB and CB Audio Med. Res.	£259.00 (a)
TILT and SWIVEL Stands for Plastic Case Only	£19.00 (a)
Plinths	
BBC B Single	£11.00 (c)
BBC Master Single	£12.00 (c)
BBC Master with Shelf	£22.00 (b)

UK Customers: Please add 15% VAT to all prices (including carriage). Government and educational establishments official orders welcomed. When ordering please enclose a cheque or postal order for the appropriate amount, UK Carriage Rates (a) £8.00 – courier insured delivery (b) £3.50 (c) £2.50 (d) £1.50 (e) £1.00. All prices are correct at time of going to press. All offers are subject to availability, all prices are subject to change without prior notification and are available on request. Current price list is available on request. Goods,normally despatched on receipt of order.

We are Licenced Credit Brokers (Please call for written details)
£1000 Instant credit available – No deposit required. APR 32.1%

B & S COMPUTING (NOTT'M) LTD
THE LENTON BUSINESS CENTRE
LENTON BOULEVARD
NOTTINGHAM NG7 2BY
PHONE: 0602 787923

ROM Boards

ATPL Sideways Model B	£35.00 (d)
ATPL Sideways Model B+	£31.00 (d)
Viglen Spare Cartridges	£2.50 (e)

Peartree Products

MR5000 Master ROM Cartridge	£8.95 (e)
MR6000 Master ROM Cartridge	£11.95 (e)
MR7200 Master RAM Cartridge	£33.95 (e)
MR8000 Master RAM Cartridge	£49.95 (e)
MR3000 Mini ROM Board BBC B only	£15.95 (e)
MR4300 Mini ROM/RAM Board BBC B only	£39.95 (e)
MR4800 Mini RAM Board BBC B only	£89.95 (d)

Printer Ribbons and Accessories

Epson LX 86 (Compat)	£2.50 (e)
Epson MX 80/RX 80/FX80/FX/85 (Compat)	£3.00 (e)
Juki 5510/Citizen MSP 20 (Compat)	£3.00 (e)
Citizen 120D/LSP10	£3.75 (e)
Taxan 810/Canon (Compat)	£3.75 (e)
Juki 6100 Multistrike	£2.30 (e)
Tally MT85 Fabric	£5.00 (e)
Tally MT85 Carbon	£7.00 (e)
Printer lead 1.5m B/B+/M128/ELK+1	£6.00 (e)
Printer lead 1.5m Compact	£8.00 (e)
Printer lead 1.8m IBM or Compatible + Archimedes	£10.00 (d)
80col Printer Stand with Paper shelves	£29.00 (c)
Printer Switch Box 2 Way "T" Switch	£34.00 (c)

Modems

All Modems inc BBC Lead

Miracle WS2000	£95.00 (c)
Miracle WS4000 Hayes compatible	£144.00 (c)
Pace Nightingale + Commstar II	£94.00 (c)
Pace Commstar II ROM	£28.00 (e)
Pace Linnet	£124.00 (c)
Pace Series 4 2123S	£230.00 (a)
50ft. Telephone Extn. Cable on Wind up Reel	£9.50 (d)

Software

Acorn Soft			
Micro Prolog	£50.00 (d)	ISO Pascal	£42.00 (d)
Logo	£44.00 (d)	BCPL	£39.00 (d)
View Printer Driver (D)	£8.00 (e)	Comal	£32.00 (d)
Lisp	£33.00 (e)	Hi View	£37.00 (d)
View Professional	£75.00 (c)	View 3.0	£39.00 (d)
Viewsheet	£37.00(d)	View Store	£37.00 (d)
View Spell (80T only)	£29.00 (d)	View Plot	£21.00 (e)
View Index	£10.00 (e)	Overview	£69.00 (c)
Word Plus (Arch)	£75.00 (c)	Logistix (Arch)	£95.00 (d)
Computer Concepts			
Interword	£39.00 (d)	Inter Sheet	£39.00 (d)
Interchart	£26.00 (d)	Interbase	£49.00 (d)
Mega 3	£75.00 (c)	Spellmaster	£42.00 (d)
Wordwise	£30.00 (c)	Wordwise +	£37.00 (d)

All latest Archimedes Software (Inc. Games) – Now in stock

Mirrorsoft			
Fleet Street Editor	£31.00 (d)	Fonts and Graphics	£11.75 (e)
Clares			
Fontwise +	£16.00 (e)	Replica III	£11.00 (e)
Artisian (Arch)	£31.00 (e)	Artisian Support	£16.00 (e)
VINE MICRO REPLAY (State M/C and Disc Interface)			£30.00 (e)

NB It is essential to state machine and 40/80T when ordering software

Books (No VAT on Books)

Master Ref. Manuals Pt1	£14.00 (d)	Pt2			£14.00 (d)
Advanced Master Ref. Manual (Bray & Dickens)					£19.95 (d)
Lisp	£8.00 (e)	Forth	£8.00 (e)	ISO Pascal	£8.00 (e)
BCPL	£14.00 (d)	View Guide	£6.00 (e)	Into View	£6.00 (e)
View 3	£9.00 (e)	View Sheet	£9.00 (e)	View Store	£9.00 (e)
Archimedes Ref. Manual					£29.95 (d)
Arm Assembly Language Manual					£12.95 (e)
Mastering View, Viewsheet and Viewstore					£12.95 (e)
Understanding Interword					£6.50 (e)
View A Dabhand Guide					£12.95 (e)
Z88 Computing					£9.95 (e)

Fanfold Paper and Labels

2000 x 1 Part 60gm 11 x 9.5" Micro Perf.	£12.00 (c)
1000 x 1 Part 85gm 11 x 9.5" Micro Perf.	£9.00 (c)
1000 x 1 Part 90gm "Perfect" A4 Micro Perf	£12.00 (b)
1000 89mm x 36mm Labels	£4.00 (d)
1000 89mm x 49mm Labels	£6.00 (d)
1000 102mm x 36mm Labels	£5.00 (d)

Please state Single or Twin Row, when ordering Labels

CJE micro's

THE ACORN SPECIALISTS

The widest range of Archimedes Hardware & Software anywhere!

ARCHIMEDES

External Drive Interface

Fully buffered with link options. THE BEST. £30.00. N.B. not all drives are Archimedes compatible

Drive Swap Switch

For above makes external dri
internal drive '1'. Ideal f
Emulator as 5
becomes A

Driv

e links in
el to '0', saves
g a drive from a Beeb.
£9.00.

Phone CJE Micros NOW to ORDER YOUR "BABY ARCHIMEDES" as described in this magazine.
(Please ring for confirmation of availability)

DFS Utils

A quick and easy to use program that will transfer all or selected files from DFS to ADFS and ADFS to DFS.
DFS Formatter included £20.00
DFS Reader only £13.00

Monitor Switch Box

Archie/BBC. Plug both a BBC and an *Archimedes* into an *Acorn Archimedes* colour monitor. £10.00.

Archimedes <-> BBC RS423 link kit including file transfer software. £15.00.

PRICES INCLUDE VAT

P&P £1 or as quoted
TRADE & EXPORT ORDERS WELCOME
please enquire for delivery cost.
Phone/Credit Card and Official Orders welcome.

C.J.E. MICRO'S (Dept. MU), 78 Brighton Road, Worthing, W. Sussex BN11 2 EN
(0903) 213361 (3 lines)

FONTAID

'FONTAID' NLQ Fon
CANON/TAXA
(Arc

ARE

ulti Font NLQ' for most printers
(SWR workspace version now available)
'INFORM' Sideways Ram
information system!
Ring for a leaflet

PRINTERS & MONITORS

PRINTERS
Star/Canon/Panasonic/Juki
MONITORS
Philips/Microvitec
Ring for best prices

Archimedes Acorn
The choice of experience.

Special offers on ARCHIMEDES & MASTERS.
Ring for details.
Officially approved ACORN/ ARCHIMEDES Dealer & Service Centre.
Come to our shop for a demonstration.

SOFTWARE SCENE

Ingrid's Back ... no place like gnome

Price: £14.95 (80 track disc)
Supplier: Level 9 Computing, PO Box 39, Weston-super-Mare, Avon BS24 9UR.
Tel: 0934 814450
Requirements: Master or enhanced BBC Micro

I SUSPECT that in Ingrid Bottomlow, indomitable epitome of gnomic pulchritude and star of Gnome Ranger, Level 9 is on the verge of creating a cult figure. Certainly I confess to having fallen for her in a big way so I greeted the sequel Ingrid's Back with frenzied glee.

Once again this delight is aimed at those who own a memory-enhanced BBC Micro, or preferably an expanded B+ or a Master. The nicely presented package contains an 80 track disc, a pin-up of Ingrid and – most important – a booklet containing both playing instructions and The Second Gnettlefield Journal.

I won't blame anyone who boots up the game immediately, since I succumbed to that temptation, but the plain fact of the matter is that until you have read and absorbed the contents of this second journal you won't get very far in solving this complex and amusing adventure.

Ingrid's Back is a three part adventure and while each part can be tackled independently, it makes sense to approach the task logically.

Features that can now pretty well be taken for granted in a Level 9 game are the superb quality of the illustrations and text. I had to search diligently to find just two insignificant flaws in the descriptions.

There are the usual – and invaluable – high level commands which enable you to GO TO (location) giving a description of each move, RUN TO (location) which takes you more or less immediately there, WAIT FOR (name), FOLLOW (name) and FIND (name or object). You can also instruct people or creatures by naming them and asking them to go in a particular direction or perform a task – this you will *have* to do in order to complete the game successfully.

I have only one description of the humour: It is bone dry and an utter delight, both in the journal and in the text of the adventure itself. I should, however, be very interested to know if French readers find it so having once spent an evening trying to explain English humour to some puzzled friends in Carnac.

I include a sample of the admirable text descriptions – so that you can feel the flavour of it all.

'The carriage sped over the edge of the bridge, flew across the gap and landed heavily on the far bank. Ingrid waved cheerily to Gnat, who had landed head first in the river, as he waded ashore. Flopsy wagged her tail frantically. Ingrid was on the east bank of the River Dribble, with the stump of the bridge behind her. Rolling parkland stretched away along the gnorth side of the road to Ridley's End. Ingrid could see Flopsy, a fishing boat and a broken carriage.'

The aim of part one of this adventure is simple – Ingrid has to collect a number of signatures on a petition. However, not all of the folk she pursues are equally willing. Her loving Uncle Dusty – the miller – needs pinning down before he puts pen to paper and Ingrid gets involved in some hide-and-seek tactics.

Similarly, Isfrunt Garden leads her a merry dance, getting Millie's signature is something strictly for the birds and a knowledge of the Brer Rabbit stories won't come amiss, either. In all that Flopsy the dog provides invaluable assistance, if asked.

Part two starts with Ingrid needing to obtain the wicked Squire Silas' plans and to put a steamroller out of action. Success involves a bit of non-violent civil disobedience and using one's loaf. There's also the need for a fair bit of indolent inaction in this part of the adventure.

From time to time very helpful clues appear in the text, suggesting what the next course of action should be. This is particularly needed as Ingrid has to put a number of trolls out of harm's way.

There is the most amazing transportation device in this section – would you believe a Telelily? However, do experiment most carefully, and remember that you have the UNDO command at your disposal if you need to take back your last move.

There's a great deal of fun involved in working out how to see the Fiddle gets his well-deserved incarceration, there's even more fun as Ingrid attempts to free her family from theirs – she really does drop a few bricks.

Part three involves more conventional adventuring in a way. You have to collect the evidence that will bring the villain to his knees as he faces a life sentence.

Working as a maid in the manor house, Ingrid collects various items that serve to incriminate the wicked Jasper; there are some lovely touches in this section. I laughed aloud as Ingrid encountered *a duct junction with a north-south flue* and even louder as Ingrid found Jasper in the swimming pool changing room: He covered his confusion with a sock.

In this section Ingrid has help from cousin Daisy – and there's a daisy of a problem to be sorted out here, though it's all good knockabout stuff. There's also a didgeridoo-toting artist to be encountered, though I can't think who on earth Pete Austin had in mind for the original.

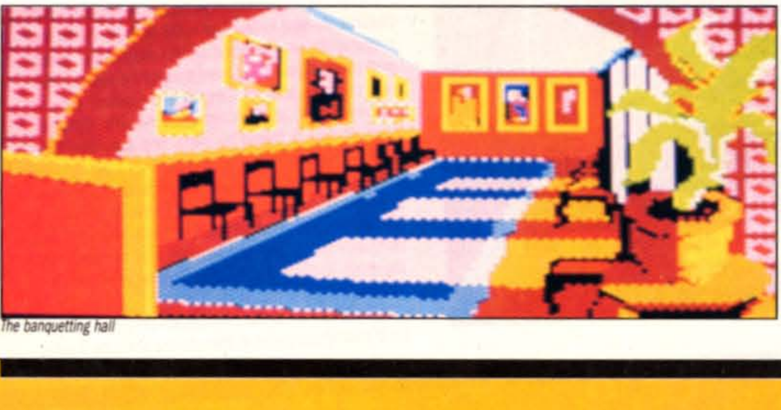
Careful mapping throughout the adventure is essential if you are to make serious progress and movement is easy – making planning your strategy fairly straightforward, and glory be, there's a non-maze to be found in part one.

Ingrid's Back is another of those adventures that I can gladly recommend to beginners and experienced players alike. Beginners will be delighted to know that there is the usual Level 9 after sales service: A detailed clue sheet is available, free of charge, if you send them the clue card provided in the package.

This is one not to be missed.

Mad Hatter

Presentation	*9*
Atmosphere	*10*
Graphics	*9*
Value for money	*10*
Overall	*9*



The banquetting hall

Overload ... keeping a bounce ahead

Price: £14.95
Supplier: Clares, 98 Middlewich Road, Rudheath, Northwich, Cheshire CW9 7DA.
Tel: 0606 48511

BEING used to seeing serious packages like Artisan from Clares, I was most intrigued to see a review copy of an arcade game. From the instructions, it seems to be a simple bug-blatting exercise.

The story, suitably tongue in cheek, is that you have to mop up an odd collection of nasties accidently created by Igor. The novelty being that you bounce around as an 11-legged flea. Be warned that it isn't as easy as it first looks.

On booting up you are presented with an attractive screen at which you can change the sound volume and enter passwords once you discover them.

When you get into the game you will find a vaguely familiar set of bugs to deal with and your flea seems to have lost all its legs and become a ball. You bounce around and have to eliminate the bugs one at a time in the right order.

It's fairly easy to avoid the wrong bugs on the first screen – but this only lulls you into a false sense of security for the second. Should you manage to bump into a wrong one you won't like it – in fact you might think that you are seeing double, because it splits into two.

In order to negotiate the maze-like layout and reach the nasties before the time limit runs out you use Z and X for bounce direction and Return for the additional height.

This last gave me a lot of trouble and definitely is a knack. Timing is critical as you have to press while bouncing upward to increase height and vice-versa. That I could live with, but at times it seems to work in reverse and I'm still not too sure why.

To add to the difficulty some screens provide only limited horizontal flooring and you can fall through the bottom and appear at the top.

Boasting 60 screens, Overload is very difficult and it's only with great patience that I got through the first three. Your time limit on the second is so short in relation to the difficulty that it is only possible to get through if you make no mistakes at all.

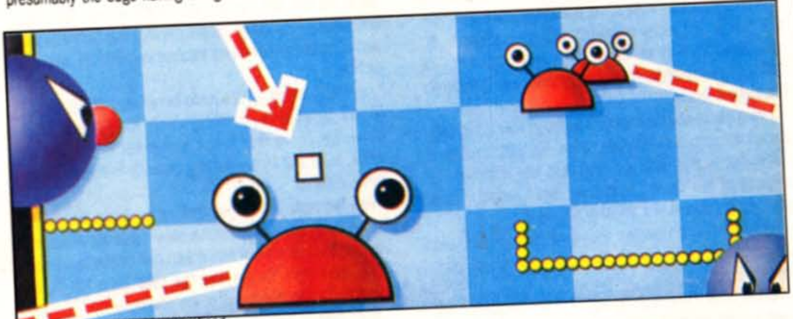
Graphics are detailed but not exceptional. While the sprites move smoothly, the backgrounds are simple coloured patterns and the maze layout is more or less a wire frame. So it's not surprising that the screens look crowded.

The mixture of sampled and synthesised sound is good. When you begin it sounds that there's a party going on – presumably the bugs having a high old time. These same bugs explode quite satisfyingly when you land on them and your bounce has a nice springy twang to it. Success on a screen is welcomed by a fanfare.

Games of this type need to be finely balanced between frustration and difficulty. If the balance is right, you will have an addictive game. Unfortunately, on this occasion I think that the authors have made it slightly too difficult. It seems that a lot of effort is expended to squash a relatively small number of bugs.

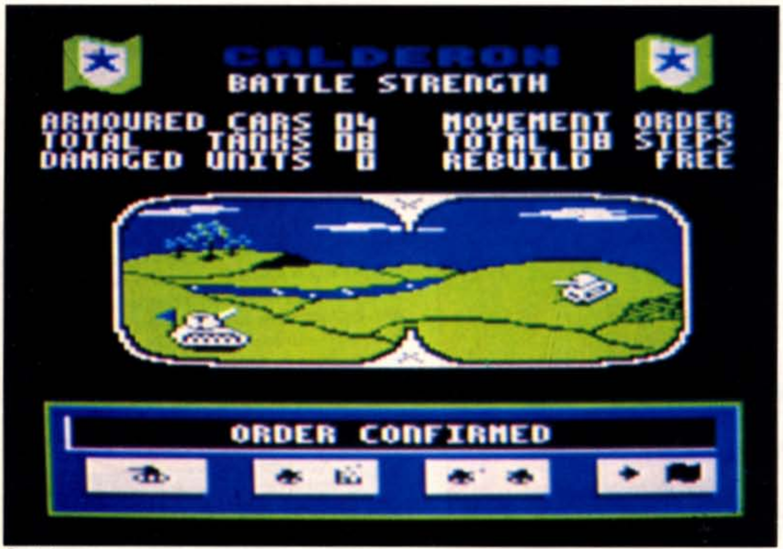
Terry Blunt

Sound	*8*
Graphics	*7*
Playability	*5*
Presentation	*8*
Value for money	*6*
Overall	*7*



Overload ... keeping a bounce ahead

Tank Attack ... let wargaming commence



```
           CALDERON
       BATTLE STRENGTH
ARMOURED CARS 04   MOVEMENT ORDER
TOTAL    TANKS 08  TOTAL 08 STEPS
DAMAGED UNITS  0   REBUILD   FREE

       ORDER CONFIRMED
```

Two tanks engage

Price: £12.99 (tape) £14.99 (disc)
Supplier: CDS Software, Nimrod House, Becket Road, Doncaster DN2 4AD.
Tel: 0302 321134

TANK Attack is a micro-mediated board game for two to four players. The package comprises a top quality fold-out playing board, 48 plastic tanks and armoured cars and a book of instructions.

The opening screen calls on you to select which of the four countries you want to take part in the conflict. My first few combinations were rejected without explanation. Close examination of the playing board revealed the cause – adjacent countries such as Sarapan and Calderon have a common border, as do Armania and Kazaldis. Opposing countries have a shaded no man's land separating their official borders.

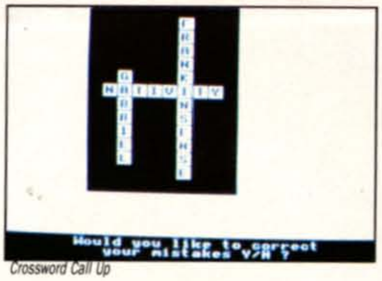
By choosing the correct countries you can devise conflicts of increasing magnitude such as one to one, an alliance of two against one or a full blooded four country war. If you are using only two of the four countries you are given the opportunity to double the strength of your forces by using the spare tanks.

Once you have made your alliances you can get on with the job of placing your pieces in their opening positions. A solid

Crosswords ... for leisure and learning

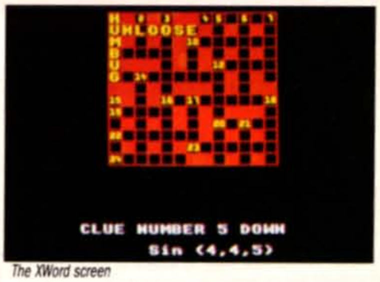
Product: XWord
Price: £9.95
Supplier: Tansoft, 210 Upper College Ride, Camberley, Surrey GU15 4HD.
Tel: 0276 682990

Product: Crossword Call Up
Price: £10.80
Supplier: NORICC, Resources Centre, Coach Lane Campus, Coach Lane, Newcastle upon Tyne NE7 7XA.
Tel: 091-270 0424



```
Would you like to correct
your mistakes Y/N ?
```

Crossword Call Up



```
CLUE NUMBER 5 DOWN
     Sin (4,4,5)
```

The XWord screen

XWORD and Crossword Call Up are both based on the familiar crossword puzzle, but use it for very different purposes. XWord is the more conventional of the two, consisting of 12 quick and 12 cryptic crosswords – all played for pleasure. Crossword Call Up uses the puzzles as an educational tool, and very effectively too.

The choice of quick or cryptic is determined by which side of the reversible XWord disc you boot up. One advantage of the computerised crossword over its hardcopy counterpart is the interactive aspect that can be incorporated by the thoughtful programmer.

Tim Tanner has included two such features – Answercheck is a routine that refuses to accept wrong answers, while Cheat will conjure up the correct answer if you feel you must stoop to desperate measures. Both can be disabled if you wish to complete the puzzle unaided.

Based upon a 13 x 13 square grid, both the quick and cryptic puzzles are of a high standard and even my ace puzzle solving wife struggled with some of the clues.

On the negative side, I was a little disturbed by the ease with which I could crash the program – by entering a large number when asked for a clue I was dumped back to Basic and Control+V followed by a number can be used to change screen mode while the program is running thereby corrupting the display. Sneaky yes, but these things should have been trapped by an otherwise well-written piece of software.

Crossword Call Up is a superb educational tool that uses the puzzle as a means of reinforcing more formal classroom study. Teachers can create databases of clues and answers that relate to specific areas of the curriculum. These can be tailored to the age and ability of the pupils concerned – young children can be given clues relating to objects in a garden, secondary school pupils could get their teeth into European geography.

The disc comes with four example subjects – Christmas, trees, 98 most frequent words and granny's garden. On selecting Make Crossword from the main menu you are prompted to choose one or more subjects from the list displayed. Having determined the level of difficulty required the program goes away and searches the database for clues and answers that meet your selection criteria.

As it is unlikely that each pupil will have a micro on which to complete the puzzle, the software can print multiple copies of the crossword and clues and answer sheets are also available on request. The printed crosswords are well laid out and of superb quality.

Crossword Call Up is so easy to use and has such enormous potential that I strongly recommend it to educational establishments of all levels. XWord contains puzzles of a high standard but is let down slightly by a few minor niggles.

Jon Revis

XWord	
Sound	***N/A***
Graphics	***7***
Playability	***7***
Value for money	***7***
Overall	***7***

Crossword Call Up	
Sound	***N/A***
Graphics	***7***
Playability	***9***
Value for money	***10***
Overall	***9***

---

blue line denotes the outskirts of each capital city, and all vehicles start from within this line.

Other points of interest on the playing board are the repair centres to which tanks may be returned when damaged by enemy fire – the length of a vehicle's confinement is determined by the severity of the damage sustained. The micro will tell a player when he can return a vehicle to active duty.

On-screen headlines are displayed before each round in the battle – these comprise a news flash, a weather report and a political comment. Prevailing weather conditions can have a marked effect upon the movement capability of one or both armies, depending on the location of the weather front.

A player's link with the micro is his battle strength display. This shows how many active tanks and armoured cars remain and also reports how many units are currently undergoing repairs. If these figures do not tally with the number of pieces on the board someone is cheating.

At the bottom of the battle strength screen are four icons, some of which will be animated – only the active ones are available. By moving a pointer over them you can choose to move, attack the enemy headquarters or finish your turn and pass control to the next player.

Selecting the movement order icon activates a teleprinter which displays your total movement allowance for the turn – this can be divided up among any number of vehicles.

Once this section is complete you can engage the enemy or fire on the opposing HQ. Both types of vehicle have a maximum range of four squares – hexagons actually – with the micro making accuracy adjustments to your shots based on the range at which you are firing.

As the battle develops you will eventually come within firing range of the enemy. The micro asks you to input the armour types of the two units involved – there are three for tanks and two for armoured cars – the numbers embossed on the underside of each unit relating to its armour strength. Finally you specify the range of your shot and battle can commence.

The view changes to that of an observer on a distant hilltop, the tanks fire one shot each and the position of the explosion shows whether or not you hit your opponent or were hit yourself.

The teleprinter informs the players of the degree of damage sustained by each vehicle – a repairable tank can be placed on a repair depot, you will be asked to remove seriously damaged ones from the board and your tank tally will be adjusted.

When you reach the enemy HQ to finish him off you must move on to the square itself, as you are not asked for a firing range. This last shot of the conflict is always accurate and always final. There is no need to go through the rigmarole of securing the remaining enemy buildings – the teleprinter display brings news that this has already been carried out and your victory confirmed.

Tank Attack is a superb program that really takes the leg work out of wargaming. By leaving the monitoring of repair times, damage assessment and weather reports to the impartial logic of the micro, the player can concentrate on what really counts – strategy.

Jon Revis

Sound	***4***
Graphics	***7***
Playability	***10***
Value for money	***9***
Overall	***9***

Holed Out ... a fairway to spend your time

Price: £12.95 (tape), £14.95 (5.25in disc), £15.95 (3.5in disc)
Supplier: The Fourth Dimension, PO Box 4444, Sheffield.

THE Fourth Dimension should be on a winner here with what is the best golf simulation I've seen on any Acorn machine. It is packed with features: Two superbly designed 3D 18-hole courses and all the hazards you would expect to find on the real thing – trees, rough, bunkers and water.

The easier course, Cone Links, is quite a challenge and after mastering this you might just be ready for the second, Pine Isles. This is quite a different ball game altogether.

You can play either strokeplay or matchplay. The idea with the former is to finish all 18 holes in the least number of strokes, while in matchplay the winner is the player who has won the most holes.

Up to four can take part with each selecting one of four skill levels from beginner to professional. The one selected dictates whether the physical hazards or wind strength and direction influence your play of a hole. For example, as a beginner only the water will affect your next shot, whereas as a pro you could be playing from a bad lie in deep rough into a strong headwind.

For all shots up to the green your view is from behind the golfer. To the side of the screen is an information panel displaying details relevant to the hole. You select a club using the Z and X keys from a range of three woods, nine irons, a pitching wedge and a putter.

Next you set the direction to hit the ball by moving a cursor left and right across the course. Here, with the relevant difficulty level you must also take into account the wind – represented by a circle with a line coming out of it. The line points in the direction the wind is blowing while its length represents its strength.

When the shot direction is set you must attempt to allocate its power using the meter. As you press Return a sliding bar advances from zero towards 100 per cent and pressing it again sets the percentage of power and causes your nicely animated golfer to take a swing at the ball. Using Z or X instead of Return when the meter is advancing will put either a hook or a slice on the ball.

When the ball is hit, its shadow travels along the ground giving an impression of distance. When it hits the ground, the way it bounces and comes to a stop is also very realistic.

Now and again the hole you are playing might have a path running along or across it. These are very useful because if you are skilful enough you can make the ball bounce on the path to make it travel further.

A ball that lands in water is declared lost and costs you two strokes. Landing in a bunker has two possible outcomes – the ball is either plugged or you have a good lie. The latter is still a difficult shot but a plugged ball is sunk into the sand and is much harder to play and the outcome of the shot less predictable.

When you reach the green the screen is redrawn and you view the scene from above. The indicator in the panel now represents the slope of the green instead of the wind. The line now points downhill and its length shows the steepness of the slope.

Again when you have set the direction of your shot, set the power and watch the golfer swing into action. There is also realism here with the ball bouncing up off the edge of the cup if you hit it too hard or running round it if you're a little off.

After each hole the score card is shown displaying all the players' progress. During strokeplay it shows each player's skill level, the number of shots and his score related to par. In matchplay the score is replaced by the number of holes by which a player is winning.

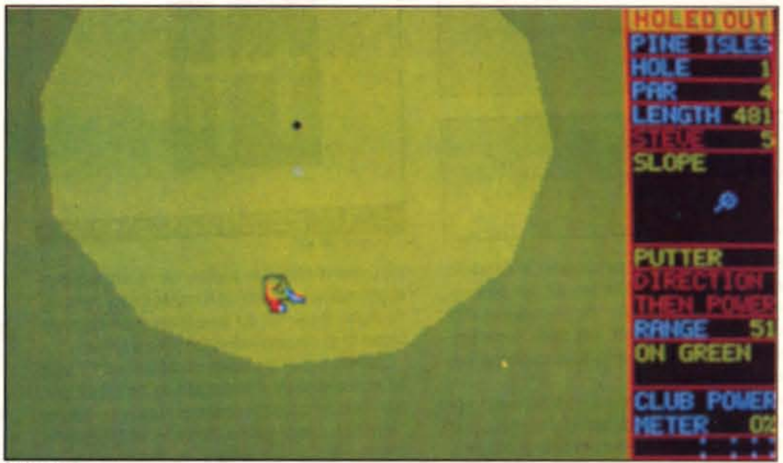
There is a lot more to this game than just whacking the ball down the fairway. Each hole is a puzzle in its own right and you have to plan your shots carefully and take the utmost care in selecting the right club and power.

There are precise maps in the well documented instruction booklet to help you plan your strokes. There's also a very useful quick reference guide to the distances – total, in the air and along the ground – that the ball will travel when using the various clubs.

The graphics are cleverly done using dithered colours to produce pastel shades on a four colour screen. Sound is restricted to the swing of the club, the striking of the ball and a few other minor noises such as a splash when your ball takes a dive.

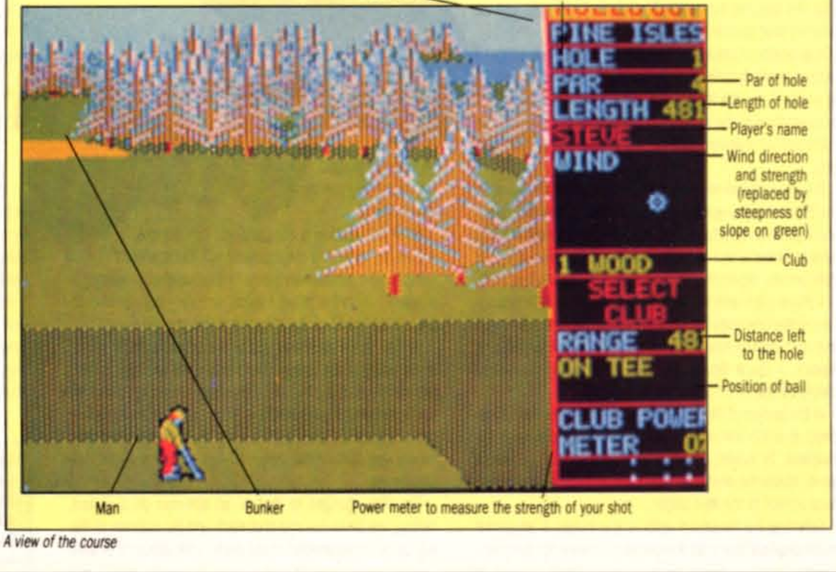
I thoroughly enjoyed the time I spent with this simulation. If you're a golfing fan wanting to keep your hand in – buy it. If you are not, still buy it – it will keep you entertained for hours and hours. This is a test of skill not to be missed.

David McLachlan



On the green

Sound	*7*
Graphics	*9*
Playability	*9*
Value for Money	*9*
Overall	*9*



A view of the course

TECHNOMATIC

Techno House, 468 Church Lane, London NW9 8TQ.
Tel: 01-205 9558 Fax: 01-205 0190 Telex: 922800

ARCHIMEDES, BBC COMPUTERS & ECONET REFERRAL CENTRE

Archimedes

Now *fitted* with *RISC OS* and with *0% finance*

You can now purchase the Archimedes systems fitted with the new multi tasking ***RISCOS*** on interest free credit. Your payment is divided in to nine easy payments over a nine month period. Additionally there are freebies to be collected.

Simply phone for an application form, complete and return it with your deposit. Subject to status, we will despatch the system to you within two days.

	Deposit	8 instalments	Total Cost
310 Base System	£104	£93	£1034
310 Colour System	£127	£116	£1287
310 + Taxan 770 +	£161	£139	£1551
PC Emulator*	£6.90	£6.21	£69
440 Base System	£325	£323	£2909
440 Colour System	£350	£349	£3142
440 + Taxan 770 +	£374	£374	£3366

*(purchased with any of the above system)
The above prices are VAT inclusive · Please add Carriage £8 base computer/£12 system
410 Series available early May

Additionally with every 310 system we give absolutely free: Graphics Writer (or Artisan), 3M 3.5" DS discs in library case (or Clares 3 game pack) and a printer lead.

Every 440 system will be supplied with items listed above plus Acorn's Software Developers Toolbox and a PC emulator (or First Word plus).

Multi I/O System

A complete I/O System on a half height eurocard featuring: Video Digitiser for use with stationary picture store, digitising to 256 colours. (colour facility thru optional breakout box) Sound Digitiser Stereo sound sampler with 8 bit resolution. RS232 Interface includes all modem control lines. 10V levels to drive RS232 lines.

ROM Sockets Up to 3 128K roms of any size. RFS software included. Joystick I/Face 15 way D connector for single dual channel joystick.

Software for these features on board.

Complete board for only £107(b)

Full spec on request

BBC MASTER

We include free Educational/Fun Bundled software from BBC Publications range (RRP £40) and a STARdataBASE package worth another £40 or a 200K 40T DS Drive (TS200)

BBC Master AMB15 **£439(a)**

Now available

*techno*CAD

The most comprehensive CAD system for the Master. Host of innovative featurs for creating complex drawings, pcb layouts, sketches etc. Virtually no restrictions on drawing sizes. On screen scaling for plotters, variety of screen dumps for compatible printers

FREE

evaluation disc available on request. The disc contains operating instructions and will perform as release version except for file functions.

WINCHESTER DRIVES

TECHNOMATIC Winchester range covers drives from 20Mb to 70Mb capacity and are available in various combinations with floppy drives and tape streamers for use with BBC computers.

The Winchester Drives are supplied formatted and are ready to connect to the computer fitted with an appropriate disc filing system.

For the Master users we supply a front end utility which displays the total contents of the drive in icon format and enables you to load any file from there.

SOFTWARE

Our software range for Archimedes and all BBC models includes: Language, Productivity, Applications and Educational packages.

FLOPPY DRIVES

A range of reliable, well constructed, attractively packaged floppy drives. The quality and reliability of these drives enables us to offer a two year warranty on all our floppy drives.

PD800P

The range comprises of single and dual 5.25" and 3.5" drives with or without integral power supply. All connecting cables included. 5.25" drives can be switched for 40 and 80 track operation.

MONITORS

A range of monochrome, colour and multisync monitors.
New additions to the range are:

Philips 7752 14" green screen monitor featuring: Flat Screen, reverse video, separate brilliance and contrast controls. **£85(a)**

Ideal for DTP/CAD/Word Processor applications **£499(a)**

Taxan 770 + 14"
Multisync Monitor

Philips CM8833 14" RGB monitor that provides full versatility. Compatible with all BBC models, Archimedes and PC Compatible systems and video recorders. Mono/Colour switch, stereo sound input **£219(a)**

For details on rest of our range please ask

PRINTERS

A wide range of printers and plotters available from stock at competitive prices. Following are our typical prices:

Epson LX 800 **£165(a)** **LQ500** **£265(a)**
National Panasonic KXP1081 + **£139(a)**
Master printer Lead

Ask for our full range of printers, plotters and accessories

ECONET ACCESSORIES

Full range of Accessories are available from stock.

Acorn's latest stackable File Store with 40 or 60Mb hard discs now in stock.

Special Pricing

We offer special discounts to health authorities and educational establishments. Written quotations provided.

It is not possible to include details of our complete range of products. Please complete the coupon or phone for our comprehensive catalogue.

We accept orders from Government, Educational and national organisations. Orders can also be placed by sending the appropriate remittance or with VISA/ACCESS cards. For fast delivery phone 01-208-1177.

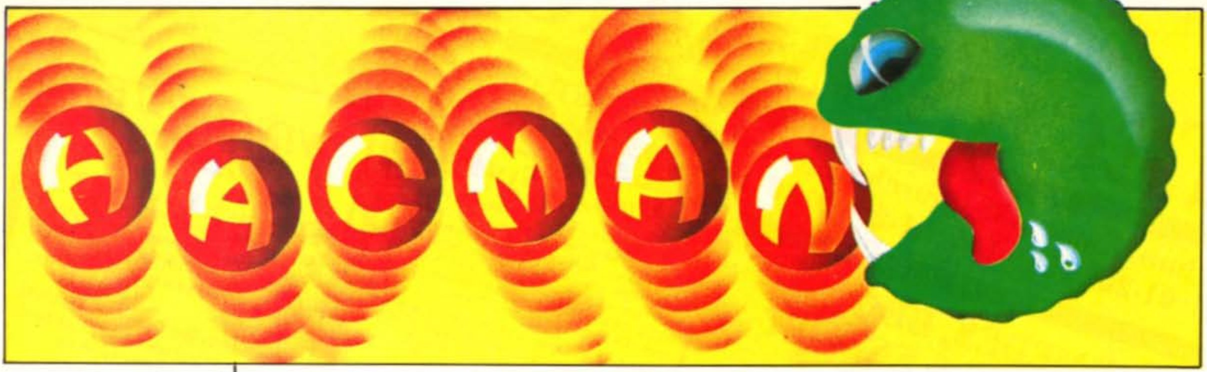
Prices do not include carriage or VAT. Carriage code. (a) £8.00 (b) £2.50 (c) £1.50 (d) £1.00

Please send me your catalogue

NAME____________________

COMPANY____________________

ADDRESS____________________



B B+ M

A DIP IN THE POOL

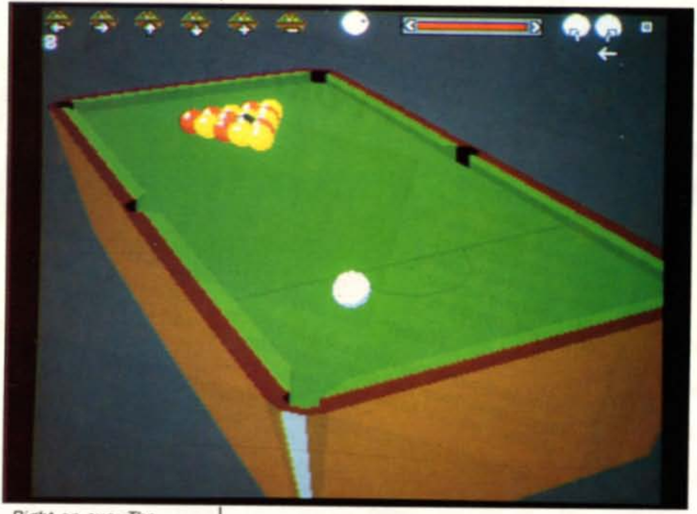
More help from our resident games expert

AN unexpected visit from the ever-elusive programmer Orlando brought me *Maltese Joe's Pool Challenge*, the proposed title of the pool game I first mentioned in January. It now contains a number of new features that were not even in the offing when he gave me my first version last September. As the name implies, it's a 15 ball pool competition against a number of increasingly difficult opponents from No-good Nick to the master himself – Maltese Joe Barbera.

There's also a practice mode in which you can tackle any player except Joe himself. You can do lots of trick shots that I wouldn't have believed possible if I hadn't seen them performed by the author.

The game is being published in a number of different machine formats by Firebird and, in particular, Archimedes owners will be interested to know that it will also be released for their machine. Orlando has been the owner of a 310M for the last six or so months and has been using it as a development machine for his BBC Micro projects.

However, this is by no means its only function. The Archimedes version of Maltese Joe's Pool immediately knocked for six the BBC Micro one that had so impressed me only a few minutes before. The animation is so fast and smooth, the colours are so vivid and the graphics so realistic that only the lack of beer stains on the baize distinguish it from a real table. It's at a very advanced stage of development and should be released not too long after the 8 bit programs.



Right on cue: The Archimedes version of Maltese Joe's Pool Challenge

Featuring:

Castle Quest
Spellmaster
Maltese Joe
Chrysalis
Repton 3
Clogger
ATS

Illegal displays

Peter Singh of Leicester has written to me in response to the point I raised back in December 1987 about games that make direct – and therefore illegal – use of the BBC Micro screen row multiplication table. He mentioned Micro Power's **Castle Quest** and, as I pointed out, the Master does not use any kind of screen lookup table, so any game that makes use of it will not set up its display correctly on one.

The effects of using the table are unmistakable and vary only slightly from game to game. In the case of Castle Quest all static features such as ladders and walls are displayed correctly, but all animated ones, like your character and the little creatures running around you, are squashed into one screen line at the top of the display. Another example is **Chrysalis** – the Icon game that I provided a fix for in December 1987. In that all the screen display is squashed into the top line, leaving a plain cyan background.

Loading the cassette version of Castle Quest can be a problem in itself. On the original the main game code data blocks are of a non-standard format and are loaded by controlling the serial system directly. The danger of this type of protection is that many of the methods used are not compatible with the Acorn serial ULA used in all BBC Micros from the later model Bs onwards.

It is possible to access the micro's serial system in such a way that non-standard cassette data formats can be read on all ULAs: All Gary Partis' later games for Audiogenic were protected in this way. Castle Quest, however, uses an illegal method and my Master failed to find any trace of the data. This immediately aroused my interest.

Peter also said that he owned a Master and was describing in detail the squashed-up screen that I first encountered immediately after changing my trusty BBC Micro for a Master – a display that would appear only if the main game code had loaded. I assumed that Peter owned either a different version of the cassette to mine or a disc version.

Either seemed possible, since I bought my cassette copy the day the game was released and it could have been changed later. With this in mind, I called Micro Power to try to find out a bit more about the various incarnations of Castle Quest. I was told to my surprise that only one version was ever released.

The official word was that some Masters can find the serial data on the tape but others, like mine, cannot. This seemed a little peculiar, because I would have thought that the same ULA would work in an identical way on all machines.

In fact I know of at least two different disc versions of the game. The first issue featured protection that was wildly incompatible with most of the disc interfaces around at the time and was therefore quickly replaced. Moreover, recently I bought a disc copy with the intention of developing a routine to allow it to be used on a Master. When I booted it up I got quite a surprise – it worked perfectly on my Master, little men and all. That makes three disc versions so far. Are there more lurking in the wings?

Unfortunately I do not have access to one of the first disc copies, but I have managed to borrow a copy of the second. This has a disc title *000006* and a cycle count of 19. The third – or, at least, the version that I own – has a title *000006M* and a cycle count of 22. For anyone who has a Master and the earlier version, the following listing is a conversion routine that sets up the character row multiplication table so the animated characters are displayed correctly:

```
10 REM Castle Quest Master compatibility
20 REM Mark II ("Opus") disc version
30 REM by Hac Man
40 REM (c) The Micro User
50 REM
60 MODE 7:VDU 23,1,0;0;0;0;
70 acccon=&FE34:oscli=&FFF7
80 FOR I%=0 TO 2 STEP 2:P%=&900:[OPT I%
90 LDA# &18:STA acccon:\ allow access to filing s
ystem ram
100 LDX# &40:.loop LDA data,X:STA &C375,X:DEX:BPL
 loop
120 LDX# cli MOD 256:LDY# cli DIV 256:JMP oscli
130 .cli EQUS "RUN !BOOT"+CHR$(13)
140 .data :]:Q%=P%
150 FOR J%=0 TO 31:K%=J%*640:P%=(2*J%)+Q%:[OPT I%
160 EQUB K% DIV 256 : EQUB K% AND 255
170 ]:NEXT:NEXT:*FX 15,0
180 PRINT "Insert Castle Quest disc: Press any ke
y...";:A%=GET
190 *DISK
210 CALL &900
```

Repton bug

Ben Dyke of Wirral, Merseyside, has a tip that will be useful to fans of **Repton 3**. He sent me this over a year ago, but I have been purposely withholding it because I think it makes the game too easy. However, now that Superior has announced that all sets of add-on Repton screens will be for Repton Infinity rather than for the earlier program, the time seems appropriate to release it.

The cheat is actually a feature – bug – inherent in the code. To access it simply walk into a skull or a section of fungus and press Return to access the status screen just before you die. When you press the spacebar to return to the game, you'll notice you've still lost a life, but the skull or fungus will have disappeared, leaving the way clear. This applies to Repton 3 and all its offshoots.

Anyone who bought the December 1988 copy of *The Micro User* will, I'm sure, have become an immediate devotee of **Clogger**, a cut-down version of which appeared on the disc given away with that issue. That featured three screens while the full implementation features 18. In true Repton style, Clogger features a password system that allows completed levels to be skipped. The full set of screens is divided into three data files – Slipper, Artist and Brushes – each with six screens. The full set of passwords, courtesy of Martin Iddon of Broxbourne, Herts, is as follows:

Slipper	Artist	Brushes
SLIPPER	ARTIST	BRUSHES
BALLET	TIPTOP	HARRIET
OXFORD	IMPALA	MOTTLEY
POLISH	BRITISH	RHUBARB
HORN	HILLMAN	ATOMIC
MULE	COTTON	STREAM

ROM CLASHES ARE STILL TAKING PLACE

The subject of sideways roms clashing with games has cropped up a few times in recent columns. The first offender reported was Computer Concepts' otherwise excellent **Spellmaster**, which interferes with the wrist computer feature of Superior's Codename:Droid. Spellmaster is by no means the only rom to clash with commercial software, after all, Disc Doctor has been doing it for years, but it has acquired a certain reputation in this area – perhaps not entirely deserved.

However I was surprised to notice recently that Spellmaster has diversified from cassettes and discs – it is now clashing with other roms. I recently dusted the cobwebs off my Acorn Teletext Adapter and pressed it back into service, only to find that things have changed. I could receive ordinary teletext pages perfectly well. But telesoftware? Not a chance.

So I obtained an Advanced Teletext Software – ATS – package, plugged the rom in and was soon moving my highlighted bar up and down the telesoftware index quite happily. When I reached the bottom, however, the keyboard locked up. The Ceefax page count was still cycling and the seconds part of the digital clock was still counting. But the micro would no longer accept any keyboard input. The only way out was to press Break.

As I've previously mentioned, such problems are caused by Spellmaster diverting the OS read-character vector for its own purposes, so any call to this routine will be serviced via Spellmaster. Fortunately the solution is quite simple: All we have to do is to overwrite the Spellmaster-modified *rdchv* vector with the original one drawn from the OS rom. Before typing *TELETEXT to access the ATS simply enter the line:

```
!&210=!(!&FFB7+&10)
```

You may recognise that this poke works in the same way as used in our May 1988 issue to cure Spellmaster's clash with Codename:Droid and February's clash of Clogger and Exmon II.

Firebird/Superior's **The Sentinel** also appears to be incompatible with Spellmaster. More news next month when I've had a chance to investigate.

MATHS EXAM?

Watch your BBC micro give you the answers — step by step!

MASTER MATHS

Mastering mathematics has just become very, very, easy. Clear, lucid solutions to any problem — complete with all the working out.

Just imagine some of the benefits:-

***UNDERSTAND** - the bits the teacher didn't explain.*
***HOMEWORK** - Check your work - get better marks*
***REVISION** - Solve questions from past papers*
Check it out — before somebody decides to ban it.

STEP BY STEP

Your BBC will give you not just the answer, but the complete, detailed, **step by step** working out.

Every single step is also explained with words, so you will **understand** just what is going on.

You will see your own, particular problem, turned into a **worked example** by the computer.

And when time is strictly limited, you won't waste hours banging your head against a brick wall.

G.C.S.E. and ages 11-16

NOW AVAILABLE FOR COMPACT AND ELECTRON WITH DFS

Covers all the topics in GCSE algebra, for levels 1, 2 & 3:-

- Solves Quadratic Equations, eg $3x^2-5x-2=0$
  Simultaneous Equations, eg $\begin{cases} 2x+y=8 \\ 2x^2-4y-10=0 \end{cases}$
  Inequalities, eg $10x+7>2(x-3)$
  Linear Equations, eg $5x+4=0$
- Finds the Value of Formulae by the Method of Substitution, eg Find $5x^3-(4x+5)$ When $x=-3$
- Changing the Subject of Equations, ● Common Factors, ● Factorizing Quadratics, ● Simplifying, ● The Laws of Indices, ● Algebraic Fractions and Cancelling, ● Expanding and Multiplying Brackets, ● The Difference of Two Squares, ● Step by Step Evaluation using the BODMAS Rule, ● Function Theory: Domain, Inverse, Range, Composite Functions, ● Wide choice of Variables (x,y,z,...).
- Draws Graphs of equations and formula's

TEST YOURSELF

Reinforce your new understanding. Could you reproduce it in an exam?

- Having solved the problem, you may if you wish, let the computer test you.
- This time **you** try to solve the problem, and your BBC **intelligently** monitors your progress, making helpful suggestions if necessary.

NATURAL PRESENTATION

The Advanced Editor displays mathematical expressions and equations in a pleasing and natural manner, just as on a blackboard or in a good text book.

- Shows indices as small characters,
- Uses 'top and bottom' quotients,
- Automatic checking for mistakes with brackets and other common errors,
- Uses normal algebraic shorthand (eg. 5abc instead of 5*a*b*c),
- Very easy to use.

TEACHER SUPPORT DISK

This enables the teacher or lecturer to build up a library of pre set problems.

Best of all, the student can immediately test himself or herself against any problem selected.

A LEVEL and AS LEVEL

NOW AVAILABLE FOR COMPACT

Covers fundamental and advanced work in Differentiation and indefinite Integration.

It particularly covers the **key areas** of

- Differentiation and Integration of Polynomials,
- Differentiation by the Product Rule and Quotient Rule,
- Differentiation by the Chain Rule, ● Differentiation of Logarithms and Exponentials, ● Integration by Parts,
- Integration by Substitutions, ● Integration of Powers of SIN and COS

Plus differentiation and integration of all the usual 'Standard Forms'.

Problems can be as complex as you wish, and you can build them up from

- A wide range of variables (x,y,z,...) ● The 'exponential' constant e, ● Any of the following functions:-

SIN COS TAN SEC COSEC COT
SINH COSH TANH SECH COSECH COTH
ARCSIN ARCCOS ARCTAN ARCSEC ARCCOSEC ARCCOT
ARCSINH ARCCOSH ARCTANH ARCSECH ARCCOSECH ARCCOTH
LN

For example, a standard problem might be to differentiate SIN(COS(6ax+1)), or, harder, to integrate ARCTAN(x).

Just like a human expert, if one technique doesn't solve the problem, then alternative methods will be tried, and the software makes effective, intelligent choices.

Shows how to utilise principles from algebra and trigonometry, such as Reciprocals, the rules of Indices, the laws of Logarithms and various identities.

DID YOU KNOW

Do you think of mathematics as Exact Reasoning or Universal Truth? Gödels incompleteness theory (1931) showed that there are mathematical statements that are true but *not provable.*
Today we accept that maths is just a creative human activity, like setting and solving crossword puzzles.

EXAM SUCCESS TODAY

MU6

Please send me promptly, the software indicated below. I enclose a cheque or postal order made payable to Maths Workshop.

NAME ....

ADDRESS ....

....

....

For GCSE

Symbolic Algebra (Includes Advanced Editor and Test Yourself Facility)	(£19.95)	40T	80T
Teacher Support Disc	(£14.95)	40T	80T

For A LEVEL and AS LEVEL

Symbolic Calculus (Includes Standard Editor)	(£16.95)	40T	80T

My Computer is a BBC B ☐ BBC B+ ☐ BBC Master 128 ☐
Electron with DFS ☐ Compact ☐

If you have any queries ring us on 0909 500599

OUTSIDE EUROPE: include the full price, and add an extra £4.00
COMPACT: Add £2/Disk. Not suitable for networks.

MATHS WORKSHOP, DEPT MU, 95 SOUTH AVENUE, WORKSOP, NOTTS. S80 2RE

Art of the matter

Painting may be quite an education. Malcolm Banthorpe investigates

Product: Art Nouveau
Price: £42.50
Supplier: CAL, Strathclyde Business Centre, Princess Road, New Stevenston ML1 4JB.
Tel: 0698 62629

ART seems to be popular on the Archimedes at the moment, and Art Nouveau from Computer Assisted Learning is a new program to join the competition. It works in Mode 15, providing 256 colours and 640 by 256 resolution and while suitable for general use, it is particularly aimed at the education market and was developed by teachers in conjunction with graphic artists.

It is supplied on an unprotected disc and the bulk of its manual is devoted to a tutorial section of six lessons which take you step by step through all the features. It assumes no previous experience of this type of program and even complete novices should experience little difficulty getting what they want on screen – particularly if they approach it one lesson at a time.

The rest of the manual is an alphabetically arranged reference section which points to the relevant parts of the tutorial. Those familiar with computer graphics will have little difficulty finding their way around with this section alone.

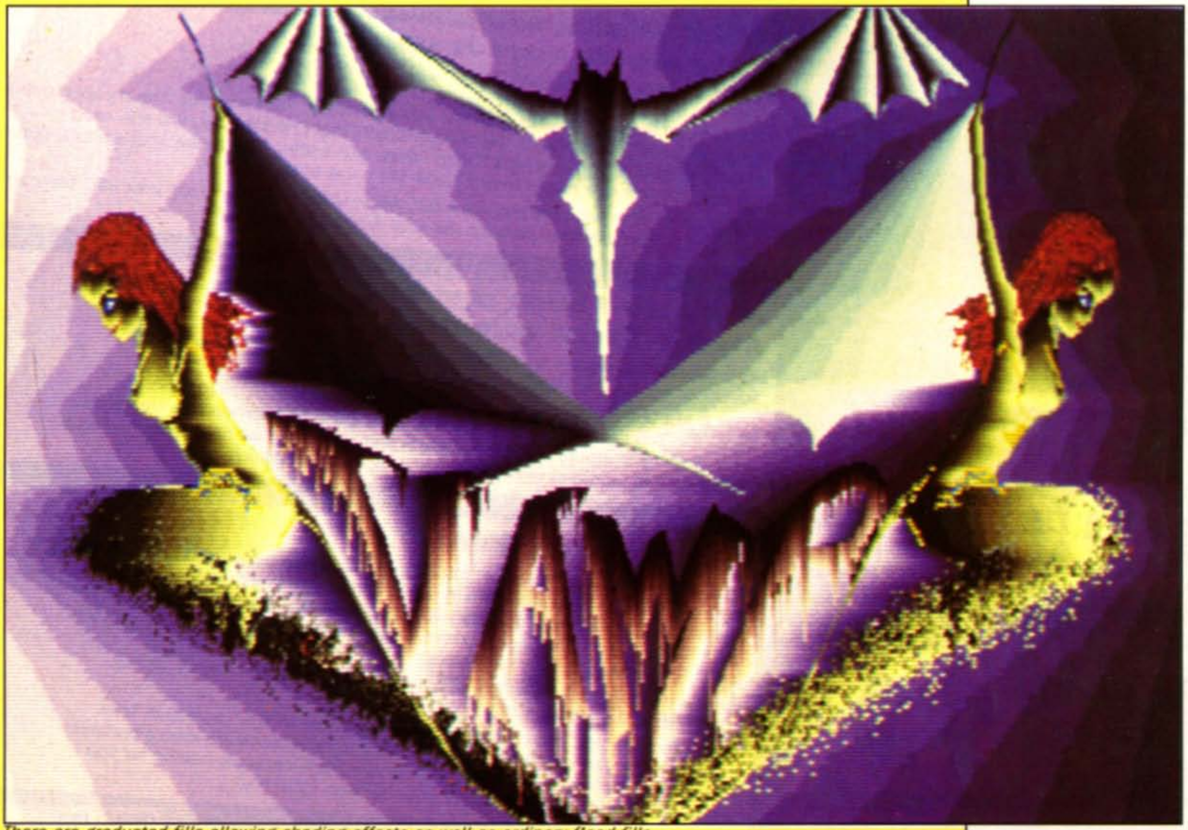
All operations are accessed from a menu bar at the top of the screen and this appears whenever the mouse's menu button is pressed. The pull-down menu selection method has been modelled on the Macintosh rather than the Archimedes standard – which is not a point in its favour as non-conformity is a disadvantage.

Pressing the menu button over one of the items on the top bar brings up a list of items. Continuing to depress the button, run the pointer down the list of items. When the desired one is highlighted release the button and it is selected. Sub-menus are available via arrows on the right of the option.

The number of facilities include all the normal shape-drawing, filling, text and filing options that you might expect. One missing is rotate, although this is partly compensated for by allowing user-defined line drawings that can be scaled or rotated.

Like most other painting packages, Art Nouveau uses twin screens to allow one to be

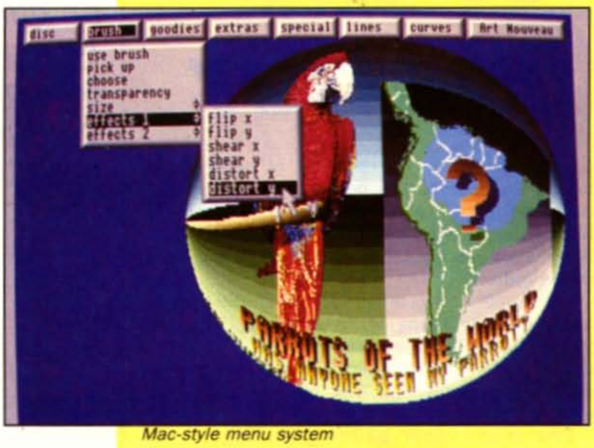
Turn to Page 40 ►



There are graduated fills allowing shading effects as well as ordinary flood fills

◄ From Page 39

updated while preserving an older copy, which permits some facilities to be undone. However, more direct control than usual allows you effectively to work on two images at once and they can be merged in various ways. You can also merge pictures from disc and Mode 12 screens may be loaded and converted to Mode 15. A section of the screen can be grabbed then used as a brush or, alternatively, it can be bent, waved and otherwise distorted and made to fill a previously-drawn shape. A number of colours may be declared as transparent to allow masked sprites to be created, hence allowing irregular shapes to be cut and pasted.



Mac-style menu system

There are several curve drawing options beyond the usual ellipses, circles and arcs. These operate in a similar way to the Bezier curves of ProArtisan and the Welcome disc font editor, but with only one central control point which is moved with the mouse. There are graduated fills allowing shading effects as well as ordinary flood fills.

The package contains a large number of well thought-out facilities which are not found in others of comparable price. It lacks the sophistication of some other software, but is ideal for the education market.

Summing up

As general purpose painting software Art Nouveau is difficult to fault and should prove particularly popular in the education market at which it is aimed. While not reaching the sophistication of ProArtisan it does have a lot going for it and seems very good value.

The truth about TELEX

How much does it cost to go on Telex?

You could go the conventional way and buy a dedicated Telex machine. The cheapest will cost you £1,604 (the Whisper), the dearest £2,892 (the Cheetah). You will also need a separate telephone line, costing £101 to install, plus £404 a year rental. That's a total outlay over the first year of a minimum of £2,109. (All prices include VAT.)

Or you could do what more and more BBC Micro users are doing – use your BBC Micro to double as a Telex machine. And just use your ordinary telephone!

How do I turn my BBC Micro into a Telex machine?

All you need is a modem and appropriate communications software (see the advertisements in this issue), a telephone, and a subscription to *MicroLink*.

Telex is just one of a growing number of services available to micro users on *MicroLink*. You can also read the news as it happens, go teleshopping, create your own closed user group, send telemessages and electronic mail right round the world, download free programs directly into your micro . . . and much more.

But why use Telex?

Because it's a standard means of instant communication between businesses. Today there are 150,000 Telex machines in use in Britain – and more than 2 million worldwide. It's used to dramatically speed up business communications – it's just as quick as using the phone but far more efficient, because you have a hard copy of every "conversation" for your records.

But there's a big bonus you get when you use *MicroLink* for Telex that the conventional way doesn't offer.

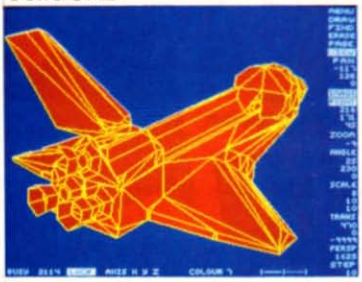
With *MicroLink* you don't HAVE to be in your office to send or receive Telex messages. You can just as easily use your computer at home (or even a portable). So now you can check whether there are any Telex messages waiting for you – anywhere, anytime. How's that for your business efficiency?

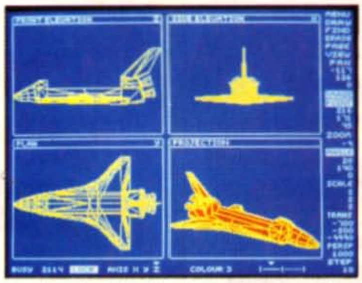
How to join:
Phone 0625 878888

SILICON VISION

SOFTWARE FOR THE ARCHIMEDES & BBC

SolidCAD





The ultimate 3D Draughting System for Architectural design, Interior design, Engineering Design and Teaching CDT. Allows drawing in plan, front & side elevations and also directly in 3D view. Includes powerful zoom & pan options for precision draughting and surface definition for creating solid colqur objects. Also includes Sweep, Extrude & Macro facilities for designing very complex objects easily. Designs created with SolidCAD are compatible with the Realtime Graphics Language for high-speed flicker-free animation. The custom Archimedes version also performs smooth shading for realism. SolidCAD(Arc) users can upgrade to the Realtime Solids Modeller (Arc) for £40.00.

£49.95 (ARC or BBC B/B+/Master), ***New***

REALTIME SOLIDS MODELLER

The package includes both the sophisticated design environment of SolidCAD and the high speed animation capability of a Realtime Graphics Language (RGL) module developed in pure ARM Risc code for supercharged performance. The package is ideal for Architectural design, Interior design, Engineering design & teaching CDT. The RGL module can be used to create standalone flicker-free animation of designs from your own programs. Smooth shading is also performed for realistic images. Through our in-house expertise in 3D Design and High-speed techniques, no other package can rival the design environment & animation speed of the Realtime Solids Modeller.

£89.95 (ARC) ***New***

REALTIME GRAPHICS LANGUAGE

The Realtime Graphics Language rom provides a complete 3D Solids/Wireframe animation system with 52 star commands and 3D Editors for designing objects to animate from your own programs. Includes a 35,000 pixels / sec line generator for fast 3D drawing rates, 3D Rotate, Scale, Orbit, Perspective and Turtlegraphics. Also compatible with designs created with SolidCAD (BBC).

£49.95 (BBC B/B+/Master)

SUPER-DUMP

The ultimate printer driver which takes advantage of the highest resolution capability of ordinary Epson compatible printers to provide 1920 × 1024 resolution. Images can also be scaled, positioned and previewed before printing. Fully compatible with SolidCAD, Realtime Graphics Language, Gate-Array design system & 3D CAD/Animation system. Your own graphics programs or other CAD packages can be made compatible with Super-Dump by the addition of a few simple commands. An example program is included in the package.

£15.95 (BBC B/B+/Master), £24.95 (ARC) ***New***

Presentation System

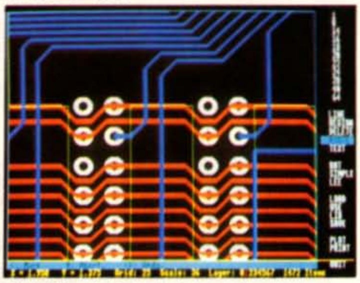
The package provides an interactive environment to create, edit and play-back computer controlled presentations for lectures and demonstrations. Also handles graph plotting for polynomials & user-defined functions which can be incorporated within the presentations.

£34.95 (BBC B/B+/Master), £49.95 (ARC) ***New***

All Archimedes software run in native mode on A305 – A440

SILICON VISION LTD, SIGNAL HOUSE, LYON ROAD, HARROW
MIDDLESEX HA1 2AG. TEL: 01-422 2274 or 01-861 2173
FAX: 01-427 5169. TELEX: 918266 SIGNAL G.
(Access/Mastercard/Eurocard accepted)
All prices include VAT and Carriage (Overseas orders add £4).

ARC-PCB



The ultimate PCB design system developed specifically for the Archimedes with a specification that cannot be matched. Includes Automatic routing, Rats-nesting, 8 layers, Surface mount capability, 0.001" resolution, 32" × 32" maximum board size, On-line Help, Fast Zoom/Pan/Redraw, Text & Silkscreen facility, Variable Line/Pad/Text/Grid sizes, Part Libraries, Block Move/Copy/Rotate/Mirror/Erase options, and up to 300,000 components.

For hardcopy, the system supports the industry standard HP-GL, GRAPHTEC, PLOTMATE plotters and printers at their highest resolutions. Also provides automatic drilling information with extensive support from PCB manufacturers for final layout and production, optional 1 year telephone Hotline support (£100) and software maintenance service (£75) is also available.

£195.00 (ARC) ***New***

Risc BASIC

The first true BASIC V syntax compiler which will convert your programs into supercharged Risc code for turbo performance leaving the competition standing. Features include Relocatable modules, full cross references, Double precision floating point & Integer support, in-line assembly, Window-based or command line compilation environment, standalone code generator, object code optimiser, full array manipulation and dimensions support, multiple exit structures & full runtime error handler.

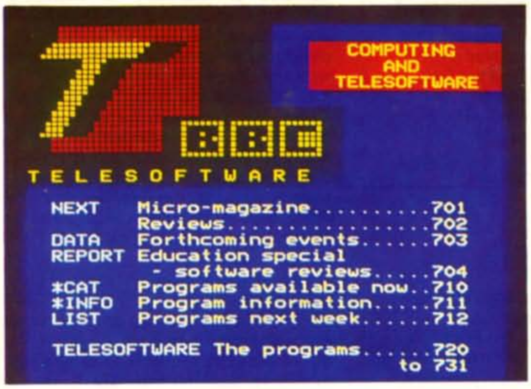
£99.95 (ARC) ***New***

RiscFORTH

A new 32-bit implementation of the FORTH-83 standard, designed to take full advantage of the ARM architecture. Features include Multi-tasking, Optimising compiler, built-in ARM assembler with floating point mnemonics, built-in Full screen Editor, File system interface, OS calls support, Floating point & Integer maths, WIMP support, Single-step debugger, Shadow screen for documentation, Block manipulation, Dictionary & Vocabulary display, Call finding and a standalone code generator.

£99.95 (ARC) ***New***

Obtain FREE software at any time with this teletext receiver



```
                                COMPUTING
                                   AND
                               TELESOFTWARE
            BBC
T E L E S O F T W A R E

 NEXT    Micro-magazine..........701
         Reviews.................702
 DATA    Forthcoming events......703
 REPORT  Education special
           - software reviews.....704
 *CAT    Programs available now..710
 *INFO   Program information.....711
 LIST    Programs next week......712

 TELESOFTWARE The programs......720
                                to 731
```

With the Morley Teletext Adapter you can download software whenever you like at no charge whatsoever. Programs are updated every week and range from educational and utility software to exciting games.

You'll also be joining the 3.5 million households who regularly access the thousands of pages on Ceefax, Oracle and 4-Tel to check programme details, football results, share prices, up-to-the-minute news bulletins and much more.

The Morley Teletext Adapter is the most popular unit on the market with more than 10,000 satisfied customers – including the Department of Transport who use it to display weather maps at service stations throughout the country. It plugs straight into the user port, includes menu-driven software and automatically tunes itself to the required channel.

You'll be able to store pages in memory, use the real-time clock in your programs and automatically load associated pages each time you select a page from the menu – considerably speeding up access time.

The Morley Teletext Adapter is an ideal companion for your BBC Micro system.

Note: If you use your BBC Micro's auxilliary power socket for your disc drive, or any other external device, you will need a power supply which we can provide for an additional £9.95.

MORLEY ELECTRONICS
TELETEXT ADAPTER SUPPORT ROM
User Guide
MORLEY ELECTRONICS
Advanced Teletext System USER GUIDE
MORLEY ELECTRONICS
TELETEXT ADAPTER

SAVE £27!

Look what you get!

- **Stylish beige teletext unit**
- **Official BBC Advanced Teletext rom**
- **16k utility rom (plus printer dumps)**
- **Utilities disc packed with programs to help you make the most of your receiver**

NORMAL PRICE £127

SPECIAL OFFER PRICE £99.95

including VAT and p&p

FREE!

When you order a Morley Teletext Adapter you will also receive a FREE gift of Morley's Design 7 Plus Mode 7 editor, worth nearly £10.

IMPORTANT: The BBC points out that a teletext adapter, like a TV set, will not work satisfactorily without a good outside aerial. Nor will it function correctly if you experience reception problems such as ghosting. They emphasise that these problems only affect a few areas of the country. However if you have any doubts as to the quality of signal available in your area you should contact the BBC Technical Support Service during office hours on 01-927 5040.

TO ORDER PLEASE USE THE FORM ON PAGE 135

Your technical questions answered by MIKE COOK

PROBLEM SOLVED

On the agenda...

- **Interfacing with the outside world**
- **Adding to the Archimedes**
- **Extending the Body Build sketcher**
- **Advancing into the future**
- **Deciding between FXs and switches**
- **Shimmering screen displays**
- **Missing bits in Body Build programs**
- **Writing about fax**

Expansion cards

THE original BBC Micro has several interfacing possibilities, many of them covered in the Body Building series. The 1MHz bus has the most potential but I feel that the daisychaining of boards with edge connectors and ribbon cables is rather crude and untidy. A solution may be the Eurocards and racking system mentioned on Page 473 of the User Guide, but I have never come across them.

Were any produced by anyone and did Acorn ever publish a recommended specification for the backplane bus for such a system? I am intending to undertake some interfacing and would not like to re-invent the wheel. – **Peter J. Ward, Hurstwood Park Neurological Centre, West Sussex.**

● *Acorn did have some rack systems – I saw them at an exhibition shortly before they launched the Atom – but they were never very popular and were discontinued long ago. It did publish a technical note on backplanes but I have not got a copy to hand.*

There is a single, Eurocard-size system known as the STE bus and this is a standard recognised by the IEEE. Not only can you get input and output cards for it but also memory ones and complete processor systems. There is a BBC Micro to STE bus interface card which plugs into the 1MHz bus and this also includes a rom to communicate with it.

It costs just over £100 with a backplane of five slots costing £60. These products are in the Farnell Electronic components catalogue, Tel: 0532 636311

Extra drive

I HAVE a Plus 3 disc drive off an Electron and was wondering if there is any way to use it as a second drive for my Archimedes. Is this possible and, if so, what cables would I need? – **S.L. Powell, Wolverhampton.**

● *The disc drive used in the Plus 3 is single sided while the Archimedes uses a double sided one. You can read single sided discs on the Archimedes, but as far as I know you can't format them using standard software. You would therefore have to write a single sided format utility and, of course, you could still only store half the amount of information.*

As to the electrical side, it is quite straightforward to fit another drive – you just need a 36-way daisychained IDC cable and it can be powered from the Archimedes' internal supply. The problem comes in mounting it – the official upgrade includes a new plastic moulding with an extra slot.

The alternative is to get one of the buffered extension kits currently being offered for attaching 5.25in drives. These can be obtained from Watford or Beebug to name but two and will allow you to connect your drive externally in the original Plus 3 case. You then have to disconnect the drive mechanism from the Plus 3 circuit board, but all you need is a ribbon cable to connect it to the interface.

When you consider that you are only getting half a drive I wonder if all this is worth the trouble?

On the button

I HAVE been interested by your Etch-a-sketch for the BBC Micro described in the March 1988 issue of *The Micro User*. I was wondering if you could have a few switches on the box as well as the two *switch 1 between pin 13 and 6 and switch 2* analogue port would I have to connect them to? – **John Wingfield, Woodley, Reading, Berks.**

● *To add extra keys you need to connect key switch 1 between pin 13 and 6 and swtich 2 between 10 and 3. These can then be read using:*

```
K%= ADVAL(0) AND 3
```

The value of K% will indicate which keys have be pressed:

K% value	Switch 1	Switch 2
0	down	down
1	up	down
2	down	up
3	up	up

If you want to add two more keys connect them

Turn to Page 44 ▶

◀ **From Page 43**

between 12 and 3 and 4 and 5. Then connect two resistors between pins 12 and 11 and 4 and 11 – the value is not critical, use about 10K. These keys can be read with ADVAL(3) and ADVAL(4) respectively. You will get zero when the key is pressed and a large number when it is up.

Time in advance

MY Archimedes has started to gain anything up to 30 minutes on the internal clock over a period of about three days. I understand that this may be due to a couple of bugs in Arthur 1.2, but could it be a faulty chip? – **Matthew Ridd, Pilton Community College.**

● *I've never heard of a software fault speeding a clock up although one could slow it down. You could try adjusting the trimmer next to the clock chip to tweak the time. If that fails take it back to your dealer.*

> “You won't damage the switch by repeated switching, however there is another solution”

Switch wear

I WORK at a school which uses several types of micro with Epson RX and LX printers. When I use a BBC Micro I have a major problem – the printers' DIP switches need to be altered in order to send a linefeed.

The teacher responsible for the printers is adamant that I must not use them with the BBC Micro, saying that altering the switches will damage or wear out the switch unit, but I find it difficult to accept this. Would you please confirm the position on this point? – **K. G. Arksey, Bedlington, Northumberland.**

● *You won't damage the switch by repeated switching, however there is another solution. You can make the printer send the line feed, by typing *FX6 when you power up or press Break. See your User Guide for more information.*

Nothing wrong

I BOUGHT a second hand issue seven BBC B with Watford's DFS and a Microvitec 457 monitor. Recently I have noticed a shimmer in the display which becomes extremely noticeable in low resolution modes. It is not caused by the video ULA overheating because directing cold air on to it makes no difference. I would be pleased if you could help. – **R. Fraser, Kirkhill, Inverness-Shire.**

● *It is difficult to know precisely what you mean by shimmer, but I suspect that you are seeing the effects of interlacing where two successive frames of video are displaced by a line. This is done on all TV systems, but it is sometimes more noticeable on micro displays.*

*This can be due to the ambient lighting conditions, the phosphor persistence of the monitor and even a person's individual sensitivity to flicker. In short, I don't think anything is wrong with your system. You can try turning the interlacing off with the command *TV0,1 and then changing mode, but note that due to the way the hardware works you can't switch off the interlacing in Mode 7.*

IF parts missing

IN the Body Building sound sampler program in March 1986's issue there is the following line:

```
IF D% THEN ...
```

Is there something missing between the *D%* and the THEN? – **Nick Moran-Dickens, via Prestel.**

● *There is nothing wrong here. Statements between an IF and a THEN are evaluated and if the result is zero the value is false. But if it is any other value the result is true and the part after the THEN is executed. so this line is equivalent to:*

```
IF D%<>0 THEN ....
```

By missing out the <>0 the program runs faster and takes up less space. This is also the way you should use IF statements with logic variables.

Incidently, the sound sampler kit is no longer available, but keep reading the Body Build articles – I have come up with an even cheaper circuit.

Facts on fax

FOR a graphic communication course that I am doing at school I am required to investigate methods of transmitting graphic information and include diagrammatic illustration showing how basic systems operate. Could you please help me get started on this? – **Michael Raynham, Cheshire.**

● *It all depends on what you mean by transmitting graphic information. I assume that what you want to know about at your level is how fax machines are set up and operate.*

Basically a fax machine scans an image and turns each tiny spot into an audio tone for transmission down a telephone line. At the receiving end the tone is turned into a signal which is used to make a mark on paper.

In the early days this was done by a rotating drum and photographic paper, but nowadays it is likely to involve computers and lasers. Providing you've got a modem you can send a fax of text from a BBC Micro via MicroLink.

Unfortunately now there are so many lots of different standards that fax machines work with they can't all communicate with each other. You could try writing to manufacturers of fax machines and also the British Telecom research establishment near Norwich.

COLOURCEL

NPQ*
INK JET
PRINTER

262,143 MORE COLOURS THAN THE MODEL 'T'

Addressable to
262,144 colours:
per pixel, 160 pixels per
inch, both axes.
1280 pixels per line.
A4 width internal paper
roll and cutter.
Compatible with Integrex
Fast Frame Grabber.
Centronics Interface.

£2995 exc. VAT

INTEGREX
ColourCel
FORM FEED
FEED
PAPER CUT
PUMP
RESET

IMAGES BY
MIKE KING
CITY POLY

*** Near Photographic Quality**

HMSO
PUBLIC SECTOR CUSTOMERS:
FOR SPECIAL PRICING
CALL 0603 695051

INTEGREX LTD., CHURCH GRESLEY, BURTON-ON-TRENT, STAFFS. DE11 9PT, ENGLAND
TEL: (0283) 215432 TELEX: 341727 FAX: (0283) 550325

RiscBASIC

ARCHIMEDES BASIC V COMPILER
THE BENCHMARKS

† BENCHMARK Name	†BASIC V secs	†ABC secs	†RiscBASIC secs	RiscBASIC /ABC Ratio	RiscBASIC /BASIC V
Repeat..Until(100000)	11.15	1.61	0.08	20.1 : 1	139.4 : 1
While..Loop (100000)	8.70	1.58	0.11	14.4 : 1	79.1 : 1
For..Next (1000000)	20.64	15.98	1.20	13.3 : 1	17.2 : 1
String_Array(10000)	0.99	1.24	0.17	7.3 : 1	5.8 : 1
Integer_Array (10000)	1.45	0.47	0.07	5.7 : 1	20.7 : 1
Real_Array (10000)	1.54	1.52	0.69	2.2 : 1	2.2* : 1
Sieve (1651 Primes)	5.19	0.52	0.07	7.4 : 1	74.1 : 1
Fibonacci	8.17	1.30	0.14	9.3 : 1	58.4 : 1
Ackerman	4.53	0.27	0.17	1.6 : 1	26.6 : 1
Grafscrn	1.67	0.95	0.80	1.2 : 1	2.1 : 1
Textscrn	2.51	2.29	2.24	1.02 : 1	1.1 : 1
Realmath	0.25	0.31	0.26	1.2 : 1	0.96* : 1
Triglog	1.20	3.42	3.42	1.0 : 1	0.35* : 1
Intmath	1.76	0.37	0.17	2.2 : 1	10.4 : 1

*Using Floating Point Emulator † All benchmarks have the ESC key enabled for fair comparison

BASIC V Syntax & Keywords	ABC	RiscBASIC
Full Array Manipulation Operations	N	Y
Local Variables with true scope support	N	Y
Multiple entry to FOR, REPEAT...	N	Y
Unlimited array sizes & dimensions	N	Y
Runtime error handling & reporting	N	Y
Full syntax implementation	N	Y
SUM	N	Y
COUNT	N	Y
WIDTH	N	Y
EVAL, INSTALL, LIBRARY	N	N

RiscBASIC is the first true BASIC V syntax compiler which produces compiled code that executes up to 20 times faster than the rival ABC compiler and up to 139 times faster than interpreted BASIC V. The Syntax comparison table also demonstrates the completeness of RiscBASIC in implementing all compilable features in the interpreted BASIC V standard with only uncompilable features remaining unsupported.

Additional features include an optimising compiler, register variables for speed, relocatable modules, full cross references, Window-based or command line compilation environment, standalone code generation, in-line assembler with powerful floating point mnemonic extensions, Arthur & RiscOS support, comprehensive compiler directives, plus free updates for future extensions from a leading Software House renowned for technical excellence that makes RiscBASIC the best BASIC V compiler money can buy.

*RiscBASIC : **£99.95** Inc VAT & Carriage*
Available from your local dealer or direct by Cheque/Access from
SILICON VISION LTD, SIGNAL HOUSE, LYON ROAD, HARROW, MIDDX, HA1 2AG, Tel: 01-422 2274, 01-861 2173, Fax: 01-427 5169, Tlx: 918266.

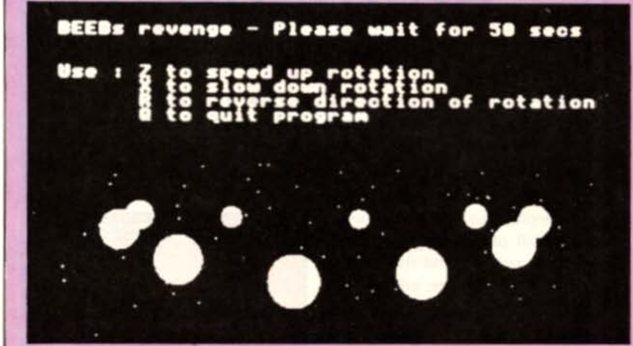
Archimedes emulated

Rob Walmsley shows how the BBC Micro can put on as good a graphics show as the Archimedes

WHEN it was first published in the January issue of *The Micro User*, Arc Graphics by Stuart Tyrell was a stunning display of the Archimedes' graphics capabilities. To give BBC Micro owners a chance to have a similar display on their micro we present here Beeb's Revenge – a program which gives a similar display to the Archimedes one. Just type the listing into your micro and check you have entered it correctly using Get it Right! Save it with the filename ARC and then enter:

```
PAGE=&1100:CHAIN"ARC"
```

You'll see the various screens being built up and, after about a minute, the display will start. So sit back and enjoy it.



```
BEEBs revenge - Please wait for 50 secs

Use : Z to speed up rotation
      X to slow down rotation
      R to reverse direction of rotation
      Q to quit program
```

CONTROLS

Key	Function
Z	Speed up rotation
X	Slow down rotation
R	Reverse rotation
Q	Quit the program

```
   10 REM BEEBS REVENGE
   20 REM By Rob Walmsley
   30 REM (c) The Micro User
   40 IFTOP>&1C00 PRINT"Lower PAGE!":END
   50 ON ERROR PROCtv(0):MODE7:REPORT:PR
INT" in line ";ERL:END
   60 Rnd=RND(-TIME):Rnd=RND(256)
   70 PROCtv(253):MODE4
   80 PROCShow(&6700):PRINTTAB(0,12);
   90 PRINT"BEEBs revenge - Please wait
for 50 secs"'"Use : Z to speed up rota
tion"SPC6"X to slow down rotation"SPC6
"R to reverse direction of rotation";SPC
6"Q to quit program";
  100 VDU24,0;0;1272;320;
  110 VDU23;6,20;0;0;0;
  120 VDU23;8202;0;0;0;
  130 VDU29,640;512;
  140 HIMEM=&1C00:PROCAnimate(8)
  150 PROCtv(0):MODE7:END
  160 :
  170 DEFPROCBlobs
  180 Q=Scrn%/NumOfScrns%*PI/5
  190 FOR X=Q TO PI*2+Q STEP PI/5
  200 R%=ABS((SINX-2)*20):X%=COSX*500
  210 Y%=SINX*70+SIN(X*8)*30
  220 VDU29,X%+640;Y%+160;:J%=R%*R%
  230 FORI%=0TOR%STEP4:Z%=SQR(J%-I%*I%)
  240 MOVE-Z%,I%:DRAWZ%,I%:MOVE-Z%,-I%
  250 DRAWZ%,-I%:NEXT:NEXT:ENDPROC
  260 :
  270 DEFPROCAnimate(NumOfScrns%)
  280 FORScrn%=1TONumOfScrns%
  290 CLG:VDU29,0;0;:IF RND(-Rnd)
  300 FORI%=0TO60:PLOT69,RND(1272),RND(3
20):NEXT
  310 PROCBlobs:PROCMove(Scrn%-1):NEXT
  320 D%=6:Di%=1:I%=0:VDU23;6,10;0;0;0;
  330 REPEAT I%=I%+Di%
  340 IF I%<0 I%=NumOfScrns%-1
  350 IF I%=NumOfScrns% I%=0
  360 PROCShow(&1C00+I%*3200)
  370 IF D%>0 T%=TIME+D%:REPEATUNTILTIME
>T%
  380 IF INKEY-67 IF D%>0 D%=D%-1
  390 IF INKEY-98 IF D%<10000 D%=D%+1
  400 IF INKEY-52 Di%=-Di%
  410 UNTIL INKEY-17
  420 ENDPROC
  430 :
  440 DEF PROCMove(S%):LOCAL B%,C%
  450 IF S%=NumOfScrns% ENDPROC
  460 B%=&1C00+3200*S%:C%=&7380
  470 FORJ%=0TO3199STEP4:B%!J%=C%!J%
  480 NEXT:ENDPROC
  490 :
  500 DEFPROCShow(A%):A%=A%DIV8:*FX19
  510 VDU23;12,A%DIV256;0;0;0;
  520 VDU23;13,A%MOD256;0;0;0;:ENDPROC
  530 :
  540 DEF PROCtv(N%):LOCAL X%,Y%
  550 Y%=7:$(Y%*256)="TV"+STR$N%
  560 CALL&FFF7:ENDPROC
```

Get it right!

```
 10 =    0 0
 20 =    0 0
 30 =    0 0
 40 = 8392 2
 50 = F892 E
 60 = 8A2A 7
 70 = BFC3 8
 80 = A306 D

 90 = 3F7F C
100 = 3EBB 5
110 = 40CF 1
120 = F716 6
130 = D818 B
140 = 6DAF 2
150 = D749 7
160 = 9719 7

170 = 6675 5
180 = 6998 C
190 = BED5 6
200 = 3DFC 6
210 = 31CD C
220 =  476 4
230 = D57A C
240 = 8E4F 0

250 = 610F 3
260 = 9719 4
270 = BD9D D
280 = 6411 7
290 = 2D9A B
300 = 604C C
310 = 5B66 2
320 = 9AF1 8

330 = BB37 D
340 = DA38 D
350 = 60E8 0
360 = 6B54 7

370 =  514 5
380 = B129 D
390 = 3067 1
400 = F8DF 4

410 = AE23 7
420 = ED0F A
430 = 9719 F
440 = 8095 2
450 = C4A4 1
460 =  752 2
470 = 2CF1 3
480 = E531 4

490 = 9719 F
500 = 84FF 5
510 = DDC5 9
520 = 77E7 B
530 = 9719 F
540 = DDD6 7
550 = 37FD 0
560 = 4C80 E
```

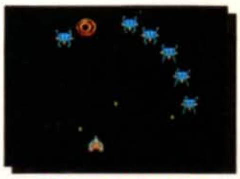
CLARES ARCADE GAMES

Some real classics from Clares, "Arcade 3" and "Overload". Pit your wits against Mega Monsters, defeat Deadly Invasions, push your playing powers to the limit.

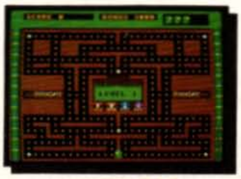
ARCADE GAMES 3
COMPILATION

This three-in-one combination will tie you to your computer terminal for hours.

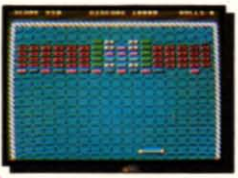
First, there's an invasion by the Evil Aliens (they're always doing that sort of thing). You are a star cadet. Can you save Zarkon from a grizzly and gruesome fate?


ZARKON INVASION

And here's a hungry little game, Mazey Man. He's feeling peckish but so are the guards, it's eat or be eaten in this gastronomic maze game.


MAZEY MAN

Bounce-A-Ball's fun, that is if you're not a brick. Because bricks get broken in this colourful and complex game, smash the colourful bricks, but can you be as quick as the ball?

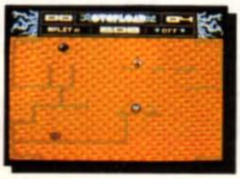

BOUNCE • A • BALL

Arcade Three, three tests of skill and ingenuity from Clares.

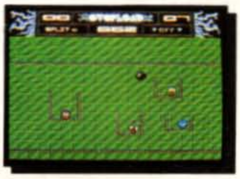
OVERLOAD
THE MEGA MONSTER EXPERIENCE

It's a mega-monster experience. Why? Well it's all Igor's fault you see. He created a whole host of video nasties after booby trapping Frank 'n' Stein's interstellar cell phone.

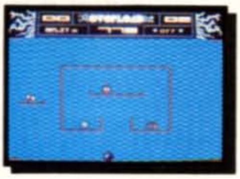
As a fitting reward for this dastardly deed, Igor is sentenced to life imprisonment in a spheroid. But spheroids being the dull places they are, drive Igor to suicide, and the trouble is, the nasties are still on the loose.



Here's where you come in, you are Cheetah, Igor's 11 legged flea. Your job, sort out those evil slime balls! It's not as easy as it looks, however, Frank 'n' Stein's set up a little sabotage of his own and the nasties must now die in the correct order.



And if that isn't bad enough, there's a time limit too. Squash the nasties in the wrong order or exceed the time limit and you could end up... well, it's just too horrible to write about.



Clares have done it again.
These games will test your skills, patience and dexterity to the limit.

£14.95

£14.95

RISC OS COMPATIBLE

CLARES
MICRO SUPPLIES

98 Middlewich Road, Rudheath, Northwich, CHESHIRE CW9 7DA.
Telephone: 0606 48511 Fax No: 0606 48512

Lost for a word?

Gordon Horsington shows how easy it can be to win anagram competitions

AN anagram is a word or phrase formed from all the letters of another word, and a lot of anagram competitions are based on discovering the maximum number. Obviously a job for the BBC Micro. The first technique that springs to mind is recursion. This method seems attractive because a micro can be programmed to generate every permutation of a list of letters – programs published in *The Micro User* Program Library in March 1988 and June 1988 could be used in this way.

However, the attraction of this technique quickly fades if you want to find all the anagrams that can be created from a long word or group of words. The figure shows an estimate of how long it would take to display the various permutations of letters of words of various lengths using recursion:

Length of word	Possible permutations	Time to print
1	1	under 1 second
2	2	under 1 second
3	6	under 1 second
4	24	under 1 second
5	120	3 seconds
6	720	17 seconds
7	5040	2 minutes
8	40320	16 minutes
9	362880	2.3 hours
10	3628800	1 day
11	39916800	11 days
12	479001600	129 days

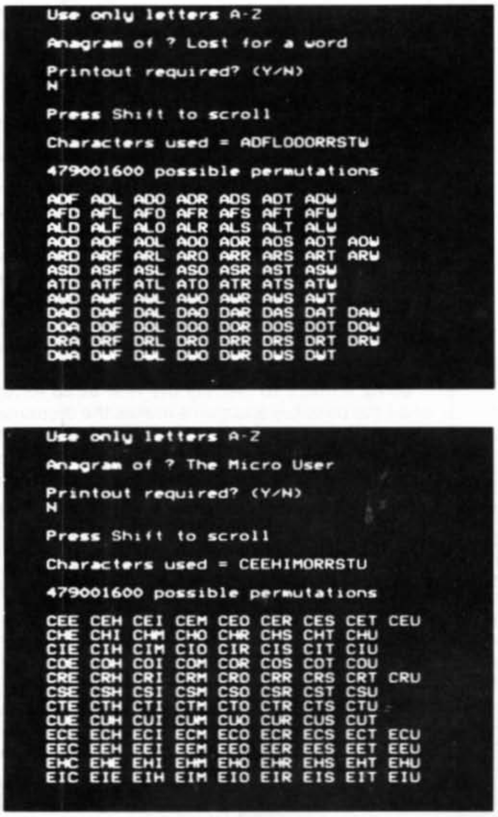
The approximate time required to solve anagrams using recursion

Using this technique to find all the permutations of a 14 letter word you would probably die of old age before the program solved the problem. Clearly this is not the way to proceed, so we need to look at alternative methods.

A spelling checker can solve anagrams and find words when only a few characters are specified. Spellmaster has a dictionary of nearly 60,000 words and makes a good attempt at solving most – but not necessarily all – anagrams.

The reason why any spelling checker will not completely solve every anagram is that it cannot contain every word that can be found in a reference dictionary. Most can extend their dictionary to include any missing words and they can even create a completely new one, but is this any help? Unfortunately not, because if a word needed to produce a complete solution to an anagram is not in the dictionary there is no simple way of knowing that it is not there!

The only way round this problem would be to type the entire Oxford English Dictionary into the spelling checker and add all the unrecognised words into its user dictionary. This would be a hopeless task – almost as bad as the use of recursive programs with long words.



```
Use only letters A-Z

Anagram of ? Lost for a word

Printout required? (Y/N)
N

Press Shift to scroll

Characters used = ADFLOOORRSTW

479001600 possible permutations

ADF ADL ADO ADR ADS ADT ADW
AFD AFL AFO AFR AFS AFT AFW
ALD ALF ALO ALR ALS ALT ALW
AOD AOF AOL AOO AOR AOS AOT AOW
ARD ARF ARL ARO ARR ARS ART ARW
ASD ASF ASL ASO ASR AST ASW
ATD ATF ATL ATO ATR ATS ATW
AWD AWF AWL AWO AWR AWS AWT
DAD DAF DAL DAO DAR DAS DAT DAW
DOA DOF DOL DOO DOR DOS DOT DOW
DRA DRF DRL DRO DRR DRS DRT DRW
DWA DWF DWL DWO DWR DWS DWT
```

```
Use only letters A-Z

Anagram of ? The Micro User

Printout required? (Y/N)
N

Press Shift to scroll

Characters used = CEEHIMORRSTU

479001600 possible permutations

CEE CEH CEI CEM CEO CER CES CET CEU
CHE CHI CHM CHO CHR CHS CHT CHU
CIE CIH CIM CIO CIR CIS CIT CIU
COE COH COI COM COR COS COT COU
CRE CRH CRI CRM CRO CRR CRS CRT CRU
CSE CSH CSI CSM CSO CSR CST CSU
CTE CTH CTI CTM CTO CTR CTS CTU
CUE CUH CUI CUM CUO CUR CUS CUT
ECE ECH ECI ECM ECO ECR ECS ECT ECU
EEC EEH EEI EEM EEO EER EES EET EEU
EHC EHE EHI EHM EHO EHR EHS EHT EHU
EIC EIE EIH EIM EIO EIR EIS EIT EIU
```

The program at work using two different phrases

In spite of these problems some spelling checkers will make a reasonable attempt to find most of the possible anagrams of longish words within a sensible time limit.

So if you want to produce the complete solution of one of the long phrases used in anagram competitions how are you going to use your micro to help you? First, to find the complete solution you need access to the reference dictionary used by the competition judges – often the Concise Oxford English Dictionary. The next step is to go back to first principles to examine the structure of words used in the language.

There are a few well known rules of word structure, including the one that Q is always followed by U, and the not so well known one that if the first letter is J then the second letter is always a vowel. If all acronyms, abbreviations, proper nouns like Ezekiel, conjoined words like H-bomb and made up words like qwerty are excluded a simple rule based on the first two letters can be used to exclude about half the permutations of

Turn to Page 50 ▶

◄ From Page 49

letters as possible anagrams.

This is based on the fact that you can decide whether or not a word can exist by looking at its first two letters. For example, words beginning with QW BC or CD cannot exist in the English language. The rule to exclude impossible first letter pairs can be applied to every possible anagram and will automatically exclude about half the possible permutations of any list of letters – but this can still leave an enormous number.

Identification

The next step forward is based on common sense. If a micro can generate billions of permutations of a list of letters, but there are only a few tens of thousands of words in the language, you can identify the possible words from their first letter pair and a third letter. A reference dictionary can then be used to find the words which begin with these triplets and these can then be compared with the original to see if they are anagrams.

Using a micro to identify the first three letters of all the possible anagrams makes the dictionary search very much quicker than just using the first pair of letters. Anagram Eliminator will help you find anagrams by eliminating those that cannot possibly exist. It will identify all the legal first letter pairs and then lists the first three letters of all the possible anagrams that can be generated.

All you need to do to find every possible anagram is use the list of first letter triplets to search a reference dictionary for possible anagrams. You may think that some of the triplets can be excluded because they are obviously not the first three letters of any recognisable word, but it is wise to look them all up because there will always be words in the dictionary that you either don't know or don't recognise.

Type in the program, use Get it Right! to ensure you've entered it as listed and save it before typing RUN. You must get the data statements right as they are used to identify the legal first letter pairs and you must take care to use the correct upper case letters and asterisks in each.

Run the program and, when prompted, ask it to find anagrams of *The Micro User*. You'll be informed that there are 479,001,600 possible permutations of the 12 letters but only the 576 possible first letter triplets in 68 groups of possible first letter pairs will be displayed ready for you to check in your dictionary.

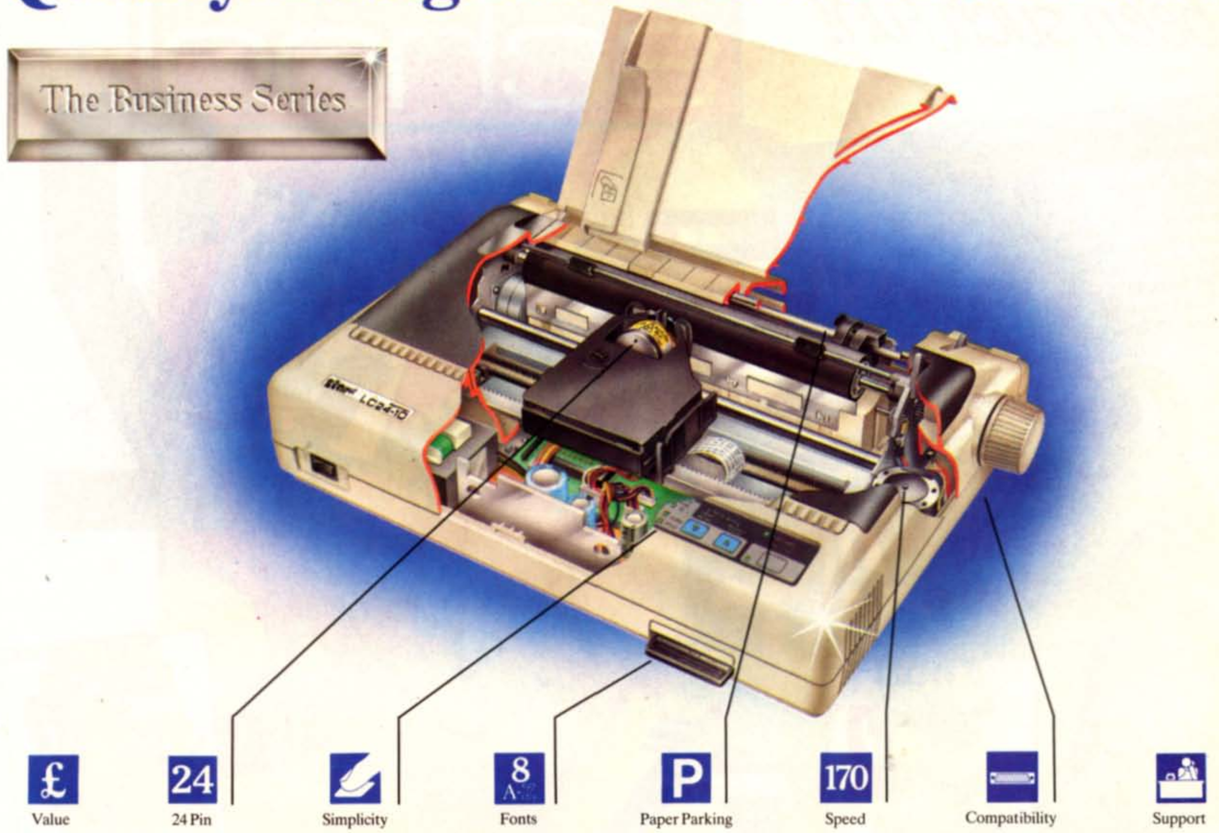
You can use this program with the appropriate dictionary to make sure you reach the tie-breaker stage of every anagram competition you enter. The only person who can get a better word count will be someone with the same program and a bigger dictionary, so good luck.

```
   10 REM Anagram Eliminator
   20 REM by Gordon Horsington
   30 REM (C) The Micro User
   40 MODE7:A%=ASC"A"
   50 DIM a%(25,25)
   60 FORF%=0TO25:FORS%=0TO25
   70 a%(F%,S%)=ASC"*":NEXT:NEXT
   80 FOR F%=0 TO 25:READ az$
   90 FOR S%=1 TO LENaz$
  100 C%=ASCMID$(az$,S%)
  110 a%(F%,C%-A%)=C%
  120 NEXT:NEXT
  140 PRINT"Use only letters";CHR$(134);
"A-Z"'
  150 INPUTLINE"Anagram of ? "anag$
  160 L%=LEN(anag$)
  170 dum$="AA*"
  180 DIM L%(L%)
  190 PROCconvert
  200 REPEAT
  210 sorted=TRUE
  220 FOR P%=2 TO L%
  230 IF L%(P%)<L%(P%-1) sorted=FNsort
  240 NEXT
  250 UNTIL sorted
  260 anag$=""
  270 FOR P%=1 TO L%
  280 c$=CHR$(L%(P%))
  290 IF c$>="A" AND c$<="Z" anag$=anag$
+c$
  300 NEXT
  310 PRINT'"Printout required? (Y/N) "
  311 REPEAT c$=CHR$(GETAND&5F)
  312 UNTIL c$="Y" OR c$="N":PRINTc$
  320 IF c$="Y" VDU2 ELSE VDU14:PRINT'"P
ress"CHR$131"Shift"CHR$135"to scroll"
  330 PRINT'"Characters used = "anag$'
  340 L%=LENanag$:N=1
  360 IF L%<33 FORP%=2TOL%:N=N*P%:NEXT
  390 IF L%<33 PRINT;N" possible permuta
tions" ELSE PRINT'"More permutations tha
n you can possibly imagine"
  400 PROCconvert
  410 ans$=dum$
  420 trip%=0
  430 pair=0
  440 O%=0
  450 REPEAT
  460 O%=O%+1
  470 I%=0
  480 REPEAT
  490 I%=I%+1
  500 IF I%=O% I%=I%+1
  510 in%=0
  520 REPEAT
  530 in%=in%+1
  540 IF in%=O% in%=in%+1
  550 IF in%=I%  in%=in%+1
  560 IF FNtest PROCprint
  570 UNTIL in%>=L%
  580 IF ans$<>dum$ pair=pair+1:PRINT
  590 SOUND 1,-5,RND(100)+50,1
  600 F%=ASCLEFT$(ans$,1)-A%
  610 S%=ASCMID$(ans$,2)-A%
  620 a%(F%,S%)=0
  630 ans$=dum$
  640 UNTIL I%>=L%
  650 ans$=dum$
  660 UNTIL O%>=L%
  670 PRINT';pair" possible first letter
 pairs"
  680 PRINT'"Maximum ";trip%" first lett
er triplets"
  690 VDU3
  700 END
  710 DEFFNtest
  720 IF I%>L% THEN =FALSE
  730 IF in%>L% THEN =FALSE
  740 IF L%(in%)=ASCMID$(ans$,3) THEN =F
ALSE
  750 =(a%(L%(O%)-A%,L%(I%)-A%)=L%(I%))
  780 DEFFNsort:T%=L%(P%)
  790 L%(P%)=L%(P%-1)
  800 L%(P%-1)=T%:=FALSE
  820 DEFPROCprint
  830 ans$=CHR$L%(O%)+CHR$L%(I%)+CHR$L%(
in%)
  840 trip%=trip%+1
  850 PRINTans$" ";
  860 ENDPROC
  870 DEFPROCconvert
  880 FOR N%=1 TO L%
  890 L%(N%)=ASCMID$(anag$,N%)AND&DF
  900 NEXT:ENDPROC
  930 REM A
  940 DATA ABCDEFGHIJKLMNOPQRSTUVWXYZ
  950 REM B
  960 DATA ADEHILORUWY
  970 REM C
  980 DATA AEHILORSTUWYZ
  990 REM D
 1000 DATA AEHIJORUWY
 1010 REM E
 1020 DATA ABCDEFGHIJKLMNOPQRSTUVWXY
 1030 REM F
 1040 DATA AEIJLORUY
 1050 REM G
 1060 DATA AEHILMNORUWY
 1070 REM H
 1080 DATA AEIOUWY
 1090 REM I
 1100 DATA ABCDFGKLMNOPRSTVXZ
 1110 REM J
 1120 DATA AEIOU
```

This is one of hundreds of programs now available FREE for downloading on MicroLink

Turn to Page 126 ►

Quality. Designed from the inside out.



For state-of-the-art printing the multi-font LC24-10 gives you value for money as well as the superior quality of a 24-pin printhead.

The LC24-10 is compatible with almost every computer's needs whatever the system. It can emulate most industry standards with ease, a standard feature that we think should always be included. For connection over longer distances, there is even the option of a low-cost serial converter.

Putting the LC24-10 to work couldn't be simpler. At the mere touch of a button on the front control panel you can choose any one of eight resident letter quality fonts, determine your pitch size or simply put the paper park into action. (No more inconvenient DIP switches to hamper you). As with all our printers, it offers both double and quad height print for striking headers.

COURIER
PRESTIGE
ORATOR
SCRIPT
OPTION
ITALIC
10
12
15
COND
PROP

170 From 0-170 characters in one second and that's just the elite draft. The LC24-10 will also perform word perfectly at a rapid 57 cps producing exceptional letter quality for pristine correspondence and important documents. And while you print, the 7K text buffer frees you and your PC to get on with other things.

£ No other 24-pin printer in this price range can match it. Features like its generous text buffer, expandable to 39K, built-in push tractor and revolutionary continuous paper parking facility are all included as standard. Another impressive feature you won't find as an optional extra is the LC24-10's versatile range of print variations. All fonts come with the option of shadow, outline and even shadowed outline to turn all text into works of art.

Behind every Star printer there's a guarantee of superb reliability together with a comprehensive back-up service for peace of mind. Should you need any help at any time, you can rely on our national three-level support system which operates throughout the dealer network and is backed by the finest distributors in the country.

THE star
COMPUTER PRINTERS

Star Micronics U.K. Ltd.,
Craven House, 40 Uxbridge Road, Ealing,
London W5 2BS. Telephone: 01-840 1800.

A Division of Star Micronics Co., Ltd., Japan.

Please send me all the information I'll need. (Alternatively, just call Belinda on 01-840 1829).

Name ____________ *Company* ____________

Address ____________

____________ *Postcode* ____________ *Telephone* ____________

L10MU6

All trade marks acknowledged. HMSO *Public sector customers may purchase at preferential terms from HMSO. Contact 0603 695256.*

Learning has never been such fun!

fun school 2

fun school 2
For the Over-8s
fun school 2
For 6-8 year olds
fun school 2
For the Under-6s
DATABASE EDUCATIONAL SOFTWARE

Fun School 2 for Over-8s contains:

- ***Build a Bridge:*** *Shape-fitting challenge*
- ***Passage of Guardians:*** *Enjoy anagrams*
- ***Unicorn:*** *First steps in problem solving*
- ***Logic Doors:*** *Mapping made easy*
- ***Souvenirs:*** *An introduction to travel*
- ***Code Boxes:*** *Discover binary arithmetic*
- ***Mystery machine:*** *Have fun breaking codes*
- ***Escape:*** *A final check on progress*

Fun School 2 for 6 to 8 year olds contains:

- ***Number train:*** *Calculations made enjoyable*
- ***Shopping:*** *Which shops for which products?*
- ***Maths Maze:*** *Fun improving arithmetical skills*
- ***Treasure Hunt:*** *Introduction to coordinates*
- ***Bounce:*** *Get to grips with angles*
- ***Packing:*** *Discover tesselating shapes*
- ***Caterpillar:*** *Word building challenge*
- ***Number jump:*** *Have fun practising tables*

Fun School 2 for Under-6s contains:

- ***Shape Snap:*** *Colourful shape recognition*
- ***Find the Mole:*** *Experiment with number sizes*
- ***Teddy Count:*** *Ideal introduction to numbers*
- ***Write a Letter:*** *Creative fun at the keyboard*
- ***Colour Train:*** *Play at spotting colours*
- ***Pick a Letter:*** *Word building made easy*
- ***Spell a Word:*** *Enjoy naming the pictures*
- ***Teddy Bears Picnic:*** *Move around a maze*

Now children can really have fun while learning. Fun School 2, designed by a team of educationalists, is available for three age groups: Under-6s, 6-8 year olds and Over-8s. Each pack comes with eight colourful and exciting programs, a colourful button badge and detailed instructions giving educational help.

The computer itself monitors the child's progress. The skill level – initially set by parents – is automatically adjusted to suit the child's ability.

Now children can enjoy using their parents' computer while they learn at their own pace.

Available for:
Spectrum, Commodore 64, Amstrad CPC, BBC Micro/Electron £9.95 (tape) £12.95 (disc).

Also: Atari ST, Amiga, PC £19.95 (PC version released in May)

DATABASE
EDUCATIONAL
SOFTWARE

Format	Under-6s		6-8 years		Over-8s	
	Tape	Disc	Tape	Disc	Tape	Disc
Spectrum	9094	9095	9096	9097	9098	9099
Commodore 64	9064	9065	9066	9067	9068	9069
Amstrad CPC	6179	6180	6181	6182	6183	6184
BBC Micro/Electron	2239		2242		2245	
BBC B+/Master 40T		2240		2243		2249
BBC B+/Master 80T		2241		2244		2250
Atari ST		9192		9193		9194
Amiga		9842		9843		9844
PC 5.25"		5764		5765		5766
PC 3.5"		5767		5768		5769

Please circle the code number of the format you require

Send to: Database Direct, FREEPOST,
Ellesmere Port, South Wirral L65 3EB.
Access/Visa orders: Tel: 051-357 2961

Please supply Fun School 2 for the code number(s) circled

☐ Cheque payable to Database Software

☐ Please debit my Access/Visa card no.

Expiry date ____/____

Signed ____________________

Add £2 per program Europe & Eire/£5 Overseas

Name ____________________

Address ____________________

Postcode ____________________

AIL 6

Moving on a bit...

Eric Crisp adds realism to his sprite animation

LAST month we created a true sprite, a moving object that did not affect the background, and made it travel smoothly across the screen. Now for the next improvement. So far, the sprite has been a letter O but a better shape would improve things – especially if it could roll. A ball changes very little when rolling unless there is a mark or dent on it.

Rotation of a dent can be carried out using a number of slightly varying pictures where it would be at the top in the first picture, to the right in the second, at the bottom in the third and to the left in the fourth. These four pictures could then be repeated in sequence to give the desired effect.

To create them we can use the definable characters – numbers 224 to 255 are always available. These are like normal characters except they can be altered by using the VDU23 command. It is a good idea to draw them on squared paper first – take a look at the accompanying panel to see how it's done.

To show the four images in sequence each character must be printed in turn, instead of just O as at present. To achieve this, a variable, *C%*, is set up which repeatedly counts from 0 to 3 so that the required character is CHR$(224+C%).

To repeatedly count from 0 to 3 we find the remainder when we divide a constantly increasing value by four: This is given by the MOD operator as used in line 22. We can use the existing variable *I%* and make *C%* equal to the remainder of *I%* divided by four. Thus *C%* will be 1, 2, 3, 0, 1, 2, 3, 0 and so on as *I%* increases. The instruction in line 22 calculates it.

These changes are included in this modified program:

```
 1 VDU 23,224,36,126,231,195,195,231,126,60
 3 VDU 23,225,60,126,231,194,194,231,126,60
 5 VDU 23,226,60,126,231,195,195,231,126,36
 7 VDU 23,227,60,126,231,67,67,231,126,60
10 MODE 1:VDU 23;8202;0;0;0;
11 VDU 19,0,4;0;:VDU 19,2,7;0;
12 COLOUR 129:CLS:GCOL 0,0:MOVE 0,100:MOVE
600,800:PLOT 85,1200,100
15 K%=0:VDU 5:C%=0
18 MOVE K%*8,380:GCOL 3,2:VDU 224+C%
20 FOR I%=1 TO 60
22 D%=C%:C%=I% MOD 4
25 MOVE K%*8,380:VDU 224+D%
30 MOVE I%*8,380:VDU 224+C%
35 *FX19
40 FOR J%=1 TO 35:NEXT
45 K%=I%
50 NEXT
```

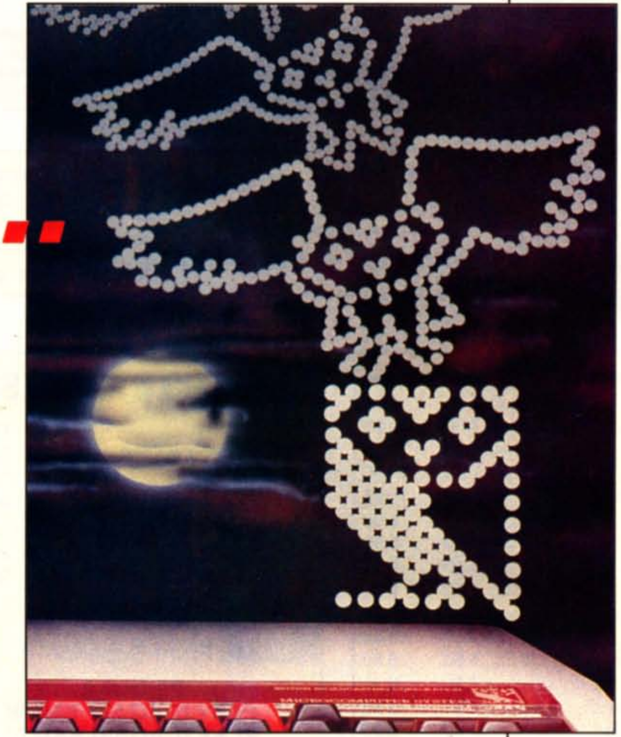
Lines 1 to 7 define the four balls while *C%* is initialised at line 15. PRINT"O" is now replaced by VDU 224+C% – which is equivalent to:

```
PRINT CHR$(224+C%);
```

Line 22 saves the old value of *C%* before calculating the new one and the delay in line 40 is shorter to ensure no flicker.

The rotation effect displayed when this program is run is not very good: Introducing an extra delay at line 32 helps by making it slower, but a

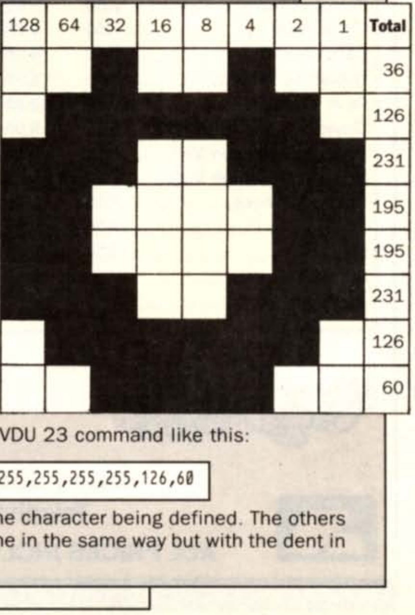
Turn to Page 55 ▶



DEFINING THE DENTED BALLS

On squared paper, draw an outline measuring eight by eight to represent a single character – each small square represents one pixel. Label the columns with the values 1, 2, 4, 8, 16, 32, 64 and 128 then draw the dented ball by filling in selected small squares as shown below.

Calculate the total for each row by adding up the column values for filled squares. The example shows a ball with the dent at the top:



128	64	32	16	8	4	2	1	**Total**
		■			■			36
	■	■	■	■	■	■		126
■	■	■			■	■	■	231
■	■					■	■	195
■	■					■	■	195
■	■	■			■	■	■	231
	■	■	■	■	■	■		126
		■	■	■	■			60

The row totals are used in the VDU 23 command like this:

```
VDU23,224,36,126,255,255,255,255,126,60
```

The value 224 is the number of the character being defined. The others – 225, 226 and 227 – can be done in the same way but with the dent in different positions.

SUPER HARDWARE BARGAINS

BBC Model B with DFS

Fully tested & supplied with free software pack

£255 (VAT inc) plus £6 carriage

Z80 Second Processors for BBC Master

Ex-demo. Run CP/M Software
Price includes software pack

£140 (VAT inc) plus £3 carriage

CURRENT TITLES	Cass	Disk
Spycat	7.50	9.95
Icarus	7.50	9.95
Tetris	6.95	9.95
Boulderdash	7.50	11.95
Indoor Sports	7.50	11.95
Quest	7.50	9.95
Play It Again Sam II	7.50	9.95
Kourtyard	7.50	9.95
Skirmish	7.50	9.95
The Lost Crystal	9.95	11.95
Spellbinder	7.50	9.95
Life of Repton	5.50	6.50
Elixir	7.50	9.95
Bonecruncher	7.50	9.95
Despatch Rider	6.00	8.95
Impact	7.50	9.95
Ransack	7.50	9.95
Ziggy	6.00	8.95
Graham Gooch Cricket	6.50	9.95
Thunderstruck II	6.50	9.95
Spy v Spy	7.50	9.95
Phantom (Tynesoft)	6.50	9.95
Winter Olympiad	7.50	12.50
Village of Lost Souls	7.50	10.50
Project Thesius	7.50	10.50
Rick Hanson Trilogy	18.00	21.00
Play It Again Sam	7.50	9.95
Spitfire 40	7.50	10.95
Palace of Magic	7.50	9.95
Crazy Rider	7.50	9.95
Codename Droid	7.50	9.95
Repton 40 Screens	5.50	6.75
Revs + 4 Tracks	10.50	12.95
Grand Prix Construction	7.50	9.95
Superior Collection Vol1	7.50	9.95
Superior Collection Vol2	7.50	9.95
Colossus Chess	7.50	12.95
The Hunt	7.50	10.95
Elite	10.50	10.95
Star Wars	7.50	10.95
Evening Star	7.50	9.95

LATEST TITLES

	Tape	Disc
Repton through Time	5.50	6.50
Saigon	7.50	11.95
Barbarian	7.50	9.95
Steve Davis Snooker	1.99	4.99
Shark	7.50	9.95
Breakthrough	7.50	9.95

NEW From Superior

PIPELINE
PLAY IT AGAIN SAM III
PLAY IT AGAIN SAM IV
PLAY IT AGAIN SAM VII
FAIR MEANS OR FOUL

PRICE HELD

Disk £9.25 each
Cass £7.00 each

NEW FROM FEBRUARY

Question of Sport
(Superior)
Disk £11.95
Cassette £10.25

NEW FOR 1989

	Disk	Cass
Play it Again Sam V	9.25	7.00
Play it Again Sam VI	9.25	7.00
Ninja	9.25	7.00
Repton Infinity	11.50	9.50
Circus Games	11.95	7.50
Superman	11.95	7.50
Exile	11.95	10.25
Empire Strikes Back	£9.95	£7.50
Summer Olympiad	£11.95	£7.50

ATS ROM

From BBC Soft For Teletext Adaptors

£9.95

Master Rom Cartridge Holder

Holds 2 Roms

£9.95

DISC SPECIALS

£3.99 each

Roundheads, World War I, Psycastria, Footballer of the Year, Bugbyte II

NEW NEW

Latest

BARBARIAN 2

Cass £7.00
Disk £9.25

NEW NEW

DISK DRIVE SPECIAL

Half height 40T double sided (200K)

£69.95

(inc VAT) plus £3 carriage

Play It Again Sam 8
Contains: Mr Wiz, Quest, Winter Olympiad, Repton 40 screens.

Cass £7.00 Disk £9.25

ACORN SPEECH UPGRADE KIT

For the BBC £19.95

TOWERHILL

Unit 7, Acacia Close,
Cherry Court Way Ind Est, Leighton Buzzard, Bedfordshire
Telephone: Leighton Buzzard (0525) 385329/383074

ALL PRICES INCLUDE V.A.T. AND P&P. OVERSEAS ORDERS ADD £2.00

◀ *From Page 53*

better solution is to use eight images of the ball instead of four.

Change lines 3, 5 and 7 so that the VDU 23s are defining characters 226, 228 and 230 instead of 225, 226 and 227. Change *C%=I%MOD4* on line 22 to *C%=I%MOD8* and insert the following:

```
2 VDU 23,225,60,124,231,195,195,231,126,60
4 VDU 23,227,60,126,231,195,195,231,124,60
6 VDU 23,229,60,126,231,195,195,231,62,60
8 VDU 23,231,60,62,231,195,195,231,126,60
```

This time the rotating motion is smoother and more realistic, an effect brought about by the smaller changes made between each picture.

So far, only a single character sprite has been used. The next program makes a man walk by using sprites two characters high. Save your ball demo then enter the new listing on the right.

Lines 1 to 6 define three men shapes. The top of the first is character 224 and his legs are character 227. The second man's top is 225 with 228 for the legs while 226 and 229 make the last one. Line 18 prints man number *C%* at position *K%* while *C%* is controlled by line 22.

Line 25 rubs out the old image – *D%* at position *K%*. Line 30 draws the new man – *C%* at *I%*. The walking speed is controlled by the delay at line 40.

```
 1 VDU 23,224,56,56,56,16,48,56,87,80
 2 VDU 23,225,56,56,56,16,16,48,48,60
 3 VDU 23,226,56,56,56,16,16,24,20,18
 4 VDU 23,227,144,168,40,68,68,130,131,64
 5 VDU 23,228,16,16,16,24,120,72,8,12
 6 VDU 23,229,17,24,20,18,36,40,36,48
10 MODE 1:VDU 23;8202;0;0;0;
15 K%=0:VDU 5:C%=0
18 GCOL 3,2:PROCMAN(K%,C%)
20 FOR I%=1 TO 60
22 D%=C%:C%=I% MOD 3
23 *FX19
24 FOR J%=1 TO 35:NEXT
25 PROCMAN(K%,D%)
30 PROCMAN(I%,C%)
40 FOR J%=1 TO 400:NEXT
45 K%=I%
50 NEXT
60 END
70 DEFPROCMAN(X%,M%)
80 MOVE X%*8,380:VDU 224+M%,10,8,227+M%
90 ENDPROC
```

The walking man routine

The procedure on lines 70 to 90 is a sprite routine. It uses the first parameter passed, *X%*, to position the man and the second, *M%*, to indicate which to draw – 0, 1 or 2. The VDU command on line 80 draws the top of the man then moves the cursor underneath with Ascii codes 10 and 8 and draws the rest.

● *Next month we'll demonstrate the limitations of using Basic by attempting multicolour sprites. And there'll be a machine code routine to overcome this, together with a sprite definer.*

RING NOW ON:
TEL: 0753 35557
FAX: 0753 511122

dataplex
10 Petersfield Avenue, Slough, Berkshire SL2 5DN
Tel: 0753 35557 Fax: 0753 511122

Conditions of Sale
- All prices exclude VAT and delivery charges
- E&OE all prices subject to change without notice
- All collections made by prior arrangement from our warehouse
- Please add £1+VAT for consumables and £6+VAT for all other items for 3 working day delivery

ARCHIMEDES

	Basic	Mono	Colour
A305	599.00	649.00	789.00
A310	709.00	759.00	899.00
A310M	759.00	809.00	949.00
A440	2149.00	2199.00	2349.00

0.5Mb Ram for 305	149.00
Podule Backplane	37.00
Rom Podule	48.00
Rom Podule +Bat. Backup	59.00
Archimedes Ref. Manual	29.00
2nd Drive for 305/310	118.00
Backplane for 4 Podules	39.00
Backplane for 2 Podules	29.00
I/E Podule	85.00
20Mb Disk & Controller	469.00
IEEE Interface	280.00
PC Emulation Pack	79.00
BBC Master 128	372.00

DATAPLEX DRIVES BBC

Drives without PSU	
5.25" Single 400K Drive	79.00
5.25" Dual 800K Drive	149.00
3.5" Single 400K Drive	65.00
3.5" Dual 800K Drive	119.00
Combo Drive	149.00
Drives including PSU	
5.25" Single 400K	89.00
5.25" Dual 800K Drive	169.00
3.5" Single 400K Drive	79.00
3.5" Dual 800K Drive	169.00
Combo Drive	169.00

All 5.25" Drives are 40/80 Switchable

DATAPLEX HARD DISK DRIVES

20Mb Hard Drive for BBC	379.00
30Mb Hard Drive	409.00
40Mb Hard Drive	459.00
60Mb Hard Drive	509.00

MONITORS

Philips 9053 14" EGA	334.00
Philips 9073 14" EGA	394.00
Philips 8873 M/Sync 14"	449.00
Taxan KX123 12" Mono	94.00
Taxan 620 12" CGA	264.00
Taxan 760 14" EGA	395.00
Taxan 770+14" M/Sync	447.00
Taxan 780 14" VGA	389.00
Taxan 980 20"	1779.00
Taxan 990 20"	1855.00
Samsung MD1257 12" Mono	89.00
Samsung CD1469 14" Col	229.00
Samsung 14" M/Sync	399.00
Samsung EGA CGA CM4531	325.00

SCOOP SECTION
For "April Fools"
While Stocks Last. So Hurry!

PRINTERS

NEW–Star-LC10 Colour (French Manual) 80colmn, 9pin, 144cps, 36cps NLQ	£189.00
Star-LC10 Colour (English Manual)	199.00
Star-LC10 Mono	161.00
NEW–Panasonic-KXP1124; 24pin; 192cps, 63cps NLQ, 6 Fonts	249.00
Panasonic-KXP1081; 9pin	128.00
MP135-9pin, 135cps, 4K Buffer	110.00
CITIZEN-HQP45, 136colmn, 24pin	299.00
CITIZEN-120D, 80colmn, 9pin	110.00

DAISYWHEEL

JUKI 6200	289.00

MONITORS

Philips BM7502 Green 12"	59.00
Philips CM8833 Colour 14"	189.00

Colour Monitor Compatibility: Atari, BBC, PC
★ Also convertible to TV!

TV Modulator	55.00

PRINTERS

Amstrad LQ3500 DI	253.00
Amstrad DMP4000	240.00
Amstrad LQ5000 DI	339.00
Citizen 180E	127.00
Citizen LSP 100P	138.00
Citizen MSP 15E	198.00
Citizen MSP 40	235.00
Citizen MSP 45	263.00
Citizen MSP 50	304.00
Citizen MSP 55	325.00
Citizen Premier 35	305.00
Citizen HQP 40	302.00
Citizen Overture 110	1007.00
Epson LX800	164.00
Epson FX850	291.00
Epson FX1050	405.00
Epson FX800	420.00
Epson EX800	445.00
Epson EX1000	487.00
Epson LQ500	267.00
Epson LQ850	444.00
Epson LQ1050	567.00
Star NX15	262.00
Star NB24-10	425.00
Star NB24-15	512.00
Star LC24-10	262.00
Star NB15	567.00
MP135	119.00
NEC P2200 Pinwriter	257.00
Cut Sheet Feeder	55.00
Serial Interface Kit	53.00
Font Cartridge	20.00
NEC P565XL	740.00
NEC P6+80 Character	438.00
NEC P7+136 Character	555.00
Panasonic KXP1592	279.00
Panasonic KXP1595	369.00
Panasonic KXP1540	418.00
Panasonic KXP3151	341.00

PRINTER CABLES

Amstrad CPC Parallel	8.90
BBC Parallel	6.50
IBM/Amstrad Parallel	8.90

RIBBONS

KXP 1081/1090/1/2	4.00
DMP 2000/3000/3160	2.80
DMP 4000	5.75
PCW 8256/LQ3500	4.50
Panasonic 3131/MP26	2.30
LX800/RX/MX/FX80	3.15
FX1000/FX/RX100	4.40
NL 10	4.40
LQ500/800/850	4.40
LC10	4.40
NEC	5.00

LASER PRINTERS

AST Turbo Postscript	2499.00
Brother HL8	1479.00
Brother HL8 QS Postscript	3789.00
Citizen Overture 110+	1149.00
Epson GQ-3500	1099.00
Hewlett Pack Laser II	1338.00
Hewlett Pack laser IID	2399.00
Panasonic KXP 4450	4699.00
Qume Script Ten Postscript	2989.00
Star LP8	1349.00

All laser printers include on site maintenance

FAX

Canonfax	
Fax110	1044.00
Fax230	1199.00
Fax350	1449.00
Fax410	1649.00
Fax730	2359.00
C-Fax Card SRI	499.00
Nefax N2	1084.00
Nefax N18	1669.00
Nefax N25	3099.00
Panfax UF150	1149.00
Panfax UF250	1494.00
Ricoh 7	789.00
Ricoh 10	1099.00
Ricoh 20	1469.00
Ricoh 60	1829.00
Ricoh 70	2439.00
Sanyofax 100	989.00
Sharp FO-80	849.00
Sharp FO-150	959.00
Sharp FO-210	1269.00

REPAIRS – As one of the largest repair centres in the country and with an investment of over £60K in our latest test equipment. We are providing our services to other dealers. So ask your local dealer to send us your faulty equipment, or send it direct to us for fast, reliable and professional repairs.

Z88 AND PSION ORGANISER

from

TK COMPUTERWARE

The mail order specialists

Z88

Z88 COMPUTER	£227	CENTRONICS I/F	£29
CARRY CASE	£10	MAINS ADAPTOR	£10
BBC LINK	£25	128K EPROM PACK	£50
32K RAM PACK	£20	Z88 COMPUTING	£10
128K RAM PACK	£50	USING YOUR Z88 BK	£10
512K RAM PACK	£200	SPELLMASTER	£59

WORDMONGERS SOFTWARE

ZBASE Z-88 → OFFBASE DATABASE FOR Z88

Designed for both first time users and experienced dBase programmers, zBase, with its Front End provides full relational database facilities on the Z88. **£69**

"zBase does indeed provide a passable near dBase environment on a portable computer..."

U.K. dBase User Group News

Z-TERM → Z88 TERMINAL PACKAGE

Scrolling and Viewdata modes. Compatible with Hayes, Miracle and dumb modems. Autodial with programmable function keys. **£52.50**

Z-TAPE → Z88 CASSETTE INTERFACE

Integrated package of software and cabling to use cassette recorder as file storage for the Z88. Includes catalogue tape, Save, Fetch and Verify. Also option to run machine program from RAM. Z-Tape menu follows the pattern of []F, Filer. **£52.50**

PSION ORGANISER

ORGANISER XP2	£139	SPREADSHEET	£40
COMMS LINK	£60	SPELL CHECKER	£30
32K DATAPACK	£35	DATA ORGANISER	£35
64K DATAPACK	£60	FINGER ORGANISER	£35
128K DATAPACK	£100	ORGANISER BOOK	£10
32K DRAM	£55	PSION PRINTER	£195

for further details contact:-

TK Computerware, Stone Street, North Stanford,
Ashford, Kent, TN25 6DF
Tel: 0303 812801 • Int: 010 44303 812801
Fax: 0303 812892 • Telex: 96676 PMFAB G
All prices include U.K. mainland delivery

VISA

1920 x 1380 RESOLUTION PRINTER DUMP

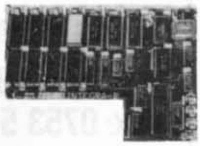
This ultra high resolution dump produces output of exceptional quality which is almost as good as a laser printer. It uses Spool files instead of screen images which allows it to produce output of very high quality. Spool files can be created from most CAD packages, as well as from your own and other programs by the addition of two commands. Main features:-

- ✓ Works with all Epson and Compatible printers
- ✓ Also works with the older Star Gemini/Delta
- ✓ Obtains maximum resolution possible on a printer
- ✓ Output is 16 times higher resolution than Mode 0
- ✓ Simple to use
- ✓ BBC B, B+, Master & Compact compatible
- ✓ FREE 16K printer buffer software for SWR
- ✓ Works with all VDU and PLOT codes
- ✓ Perfectly proportioned dump
- ✓ Diagonal lines appear straight and not stepped
- ✓ High quality diagrams are now possible
- ✓ Images can be scaled, positioned & previewed
- ✓ High speed machine code dump
- ✓ Uses disk for intermediate storage
- ✓ Many example programs included

ONLY £12.50 supplied on disk, state 5.25" 40/80T or 3.5"

A&G ELECTRONICS
28 Hurstwood Avenue, Bexley, Kent DA5 3PH (Mail order only)
Prices are inclusive – Free information sheet available

INTEGRA-β



The Expansion for the BBC Model B

The INTEGRA-β provides four operation modes - as standard Beeb or with shadow Ram and emulation of 'B+' and Master 128 features. Ideal for educational, commercial and data collection applications, as well as the private user.

An included battery-backup system, (which covers all fitted Ram), can save any data in Ram during a power-line disturbance or when the computer is switched off. Also, Rom images can be loaded from disc, stored and cleared at will, minimising the need for physical Rom changes. Compatible with DFS, ADFS and second processors conforming to ACORN® protocols.

Enjoy the facilities offered by the INTEGRA Operating System which allows you to run Model 'B+' versions of programmes with their added features also provides many of the features otherwise only available in the Master series. Control of sideways Ram even exceeds that available in the Master. Includes comprehensive machine configuration means, real-time clock with date, calendar and alarm features and commands for controlling the working environment. Will additionally allow use of the type 65C02 processor with it's enhanced instruction set.

Compatible with many applications, some of which are,
Inter-Word, Inter-Sheet, Inter-Base , Wordwise Plus from Computer Concepts. View-Sheet, View 3 from Acornsoft. AMX Super-Art, AMX Stop Press! from Advanced Memory Systems. The Publisher and Genie from Permanent Memory Systems. Music 5000 System and Ample from Hybrid Technology.

OFFER PRICES

Item	UK (Including P&P,Ins. VAT)	EEC (Incl. P&P,Ins.)	Others (Plus P&P, Ins)
INTEGRA-β	£130.00	£122.00	£118.00
32K Ram Chip*	£13.34*	£12.00*	£12.00
Dual WP Switch§	£7.00§	£8.00§	£7.00
Extra Switch*	£1.50	£1.50*	&1.50
65C02 CPU*	£8.75*	£8.75*	£8.75
If ordering separately add as indicated for P&P			
*	£1.00	£2.00	
§	£2.50	£4.00	

The WP Switch has two switches fitted with room for four more. Each switch controls two 16K banks. Fits at rear of BBC casing and leads push-on to board pins.

COMPUTECH
2 Belle Isle Terrace, Main Street, Grange over Sands AL11 6AE.
Telephone: 053-953 4604

Simple solutions

Geoff Cooper looks at some common difficulties

Q *What is the difference between hard and soft resets and how do I perform them?*

A In simple terms, a soft reset has a similar function to pressing Break on the BBC Micro – all the important pointers in memory are reset and suspended activities are lost. A hard reset is like switching the Z88 off completely and all files in ram will be lost leaving it like a new machine.

Press the button near the adaptor socket on the side of the Z88 – a bent paperclip is ideal – to perform a soft reset or do the same with the expansion slot cover open to do a hard one. Although files you've saved are usually safe when you do a soft reset, it's best to back everything vital to eprom, disc or tape before performing any type of reset.

Q *My Z88 won't switch on or off without resetting. Is there something I can do myself or will it have to be repaired?*

A If the Z88 has been left completely unpowered – or is new – it may need a hard reset initially to switch it on. However, in your case it may just be that the micro has sufficient power to retain its data but not enough to switch it on or off. You should therefore try new batteries or a mains adaptor before sending it for repair.

Q *Is there any method by which I could connect a disc drive to my Z88?*

A At present you can't connect a disc drive directly but, using a package released by Wordmongers you can use tapes. Also, using an appropriate cable and software you can connect the Z88 to most popular micros and save your files on their storage medium. Several utilities – each with their own virtues – have been published in *The Micro User* and using these you can easily save files on your BBC Micro discs or tapes.

Q *Is it safe for me to put my Z88 through an X-ray machine at an airport?*

A It is best to save all the data to eprom and have this hand checked. You should then perform a hard reset on the Z88 after the X-ray.

Q *I find retyping lines in Basic rather time consuming. Is there a better way to edit Basic programs?*

A A Basic editor was published in the April 1988 issue of *The Micro User*. However, as on the BBC Micro, you can use a word processor to edit programs. To load a program into PipeDream on the Z88 you must first save it from Basic in Ascii form – the equivalent of spooling on the BBC Micro.

To do this, load the program and enter:

```
LIST□+S
```

When you press Enter the program will list both to screen and a file called *RAM.-/s.sgn in ram. Once the listing has finished press:

```
□-S
```

You can now enter PipeDream and load the file

Turn to Page 58 ►

FILE TRANSFERS

The following utilities for transferring files between a BBC Micro and Z88 have been published in previous issues of *The Micro user*:

Program	Date	Use
Archive	March 1988	Lets you easily backup and retrieve all – or some – of the files in your Z88 to BBC Micro disc.
Convert	June 1988	Allows easy transfer of Z88 PipeDream files to your BBC Micro word processor.
Basic	July 1988	Transfers and converts Basic Programs between BBC Micro and Z88.
Zlink	October 1988	Easy transfer of files with both machines controlled from the BBC Micro.

◄ From Page 57

as plain text. Remove any blank lines and put the following lines before the program:

```
#B
.J
NEW
```

You can then edit the program and, once you have finished, save it as plain text. To load this back into Basic, use Execute which is selected from the Filer. Note that it's best not to leave a file in RAM.- as it is possible that when one is in that device performing a soft reset could result in a hard reset and all the files in the micro would be lost. Files in that device should be copied to another and deleted from RAM.–.

Q *How can I get more columns in my PipeDream spreadsheet than just A to F?*

A There are three ways you can do this:

- Use ◊EAC to add a column.
- Use ◊EIC to insert a column.
- Place a space in A1 and enter ◊BRE for block replicate. Copy from A1 as far you want – for example B1Z1. In fact you can use up to 42 columns, A ... Z then AA, AB and so on.

Q *Occasionally when I try to save or delete a file I get an* In use *error. Could you please tell what causes this and how to avoid it?*

A This is the equivalent error to the BBC Micro's *Open* and there are several ways files can be left in this state. For example, one could be opened but not closed from Basic, another application like comms software could be using it or it is open if it's being written to by the CLI or recording all screen activity to a spool file. In all these cases it can be closed in the appropriate way depending on how it was opened.

However, there is a way that files can be left open and cannot be closed without resetting the machine. When you catalogue files using the Filer, *page wait* is displayed once seven files are shown. The bottom file is actually open at that time so if you leave the display by moving to another application rather than by pressing Escape or the spacebar it will remain marked *In use*.

If this happens, the remedy is to save all suspended activities, perform a soft reset and the file can then be erased. You should not jump out of *catalogue eprom* for the same reason.

COMPUTER CROSSWORDS

EXCLUSIVE FROM AKOM LIMITED

Featuring

THE TIMES **Volumes 1, 2, 3, 4, 5, 6 & Jubilee Puzzles 1932-87**

and

The Sun Volumes 1, 2, 3, 4, 5 & 6

Prices of software with NEW Team Option are as follows:-
For Amstrad 5¼", IBM 5¼", IBM 3½", Archimedes, Atari ST
Times discs are £19.95, Sun discs are £18.95
For Amstrad 3", RM Nimbus 3½", BBC 3½", Electron +3,
BBC Master 128 ADFS, BBC DFS 40, DFS 80
Times discs are £18.95, Sun discs are £17.95
For Spectrum +3
Sun discs are £17.95. Note: no Times version
For all Acorn, Spectrum, Amstrad cassettes (No Team Option)
Times £9.95 (Vols. 1-3, +Jubilee only), Sun £7.95 (Vols. 1-4 only)
Prices include postage, packing and VAT (£1 surcharge ex UK)

Please send me:
The Times Computer Crosswords Volume(s) ....
The Times Jubilee Puzzles 1932-1987 ....
The Sun Computer Crosswords Volume(s) ....
my system is: (delete as appropriate) IBM/Amstrad/BBC/Spectrum/Atari ST/Nimbus/disc/cassette/3"/3½"/5¼"
Computer model (details) ....
Name: ____ (BLOCK CAPITALS)
Address: ____
____ Postcode ____ Tel ____
I enclose cheque/postal order for £ ____ (payable to):
AKOM LIMITED 51 MANOR LANE, LONDON SE13 5QW TEL: 01-852 4575

ARCHIMEDES EXPANSION CARDS FROM WILD VISION

HAWK V10 –

Image Processing System designed to match the high speed of the Archimedes. Captures, stores and displays up to 4 video images in real time independently of the host Archimedes.

AD1208 –

High Speed Analogue/Digital I/O Card 12-bit, 8 channel analogue to digital converter, 166000 samples per second and 8-bit "user port" digital I/O.

CHROMA 300 –

Video Overlay and Genlock System. Enables Archimedes generated graphics and text to be superimposed in full colour on a video signal from a camera or VCR. Ideal for captioning videos.

Full information on these easy to fit cards from:

Wild Vision
6 JESMOND ROAD · NEWCASTLE UPON TYNE · NE2 4PQ
TEL: 091 281 8481

Mijas Software

Bringing the new software world to YOUR BBC Micro

New Issue of
'A Book on C'
by Berry and Meekings
£11 inclusive

All software available for Archimedes as well as BBC B and Master series

Assembler, Linker, Debug, Shell and Small 'C'
New Optimiser also available (see below) £50 +VAT

Professional-style assembler, modular, relocatable, disk to disk.
Full Specification Linker giving compact run-files anywhere in memory.
Source-Level Debug for rapid and effective testing of 'C' or assembler.
Full Library facilities, 'C' and assembler Libraries provided (with sources).
★Extended implementation of the original Small C including BBC graphics.
Full Source Code provided for the 'C' compiler, add your own features!
Many times faster than BASIC, 40K+ Program space in stand-alone mode.
Post-sales support, low cost updates.

★ Original Small 'C' code supplied with the development system at the cost of distribution

New Code Optimiser

Revolutionary new Code Optimiser for Small C. Your programs use LESS memory and run up to THREE TIMES faster than before.
Forget about assembler code and use Mijas Small C for high-speed graphics, text and word processors and many other programs.
This new optimiser does not change your programs, has no restrictions, and makes them run up to 24 times faster than BBC BASIC.
Upgrade from Small C (any issue) £25+vat.
Complete system with Small C and optimiser £70+vat.

Other Microprocessors

Development system for the Mitubishi 740 series as well as for the 6502 and 65C12. Supports all the new addressing modes. Mix C and Assembler.
Write software for single board computers and other industrial applications using your BBC computer. Price including optimiser £150+VAT.

All software available in DFS or ADFS format on 5.25 or 3.5in. Discs.

Laser Typesetting Program

Professional printing you can afford today. Our new LASER TYPESETTING PROGRAM prints multi-window multi-column, multi-page Text & Graphics.
Software £25+VAT.Requires one of the new low-cost Laser or desk-jet printers with proportional fonts. Witten in Small C.
Will run on Archimedes or BBC B or Master series computer. Full C Source provided.

Now at last you can achieve the speed of a true compiler without loosing the program size advantages of BASIC.

Use it for games business or industrial software. Ideal for learning structured programming and compiler techniques.

VISA

Educational and departmental orders welcome. Please write for quantity and networking discounts. Full support on all software.

Mijas Software, Winchester Rd. Micheldever
Winchester Hants SO21 3DG
Telephone 096-89-352 (24 Hr. Answering service)

TWO WAYS TO ENSURE YOU GET

THE MICRO USER

EVERY MONTH

1. Complete and mail subscription form on Page 135
2. Hand this form to your newsagent.

Please reserve me a copy of Micro User magazine every month until further notice.

☐ I will collect
☐ I would like it delivered to my home.

Name ____________________

Address ____________________

Note to newsagent: Micro User should be obtainable from your local wholesaler, or contact Circulation Manager on 0424 430422

Upgrading to 16 bit?

Whether you're about to buy an Atari ST, an Amiga or a PC, we've got just the magazine for you.

Atari ST User, Amiga Computing and PCA are THE three top magazines dedicated to 16 bit micros. Written in the easy-to-read Database style, each magazine is the ideal companion for the micro it covers.

ATARI ST USER

£1.95

The biggest and fastest growing magazine for users of the Atari ST.

It's packed with all the information you need to make the most of your ST, including a pull-out section which grows into a complete reference guide, interviews with top ST programmers and exclusive previews of the latest business and games software.

AMIGA COMPUTING

£1.95

Britain's newest and brightest magazine for Amiga Users.

In each issue are reviews of all the latest software, ranging from games, art packages and business programs, to video titling systems, music creators and languages.

Learn about the Amiga's incredible sound and graphics capabilities, and how to write your own games, utilities and business software.

PC
Personal Computing with the Amstrad PC, IBM PC & compatibles

£1.95

The most up-to-date, fact-filled magazine devoted to the IBM PC, Amstrad PC and compatibles.

Each month it includes a free 5.25in disc, packed with the latest software, handy utilities, fast-action games, music programs and much, much more. There are thorough evaluations of all software and hardware, beginner's tutorials and language workshops, plus unbeatable special offers.

Save* £5

An annual subscription to any of these magazines is £24.95. But as a reader of this magazine if you subscribe to them using the form below, we'll give you a £5 reduction.

So send off your subscription today. Ensure you get your copies delivered straight to your door – before they appear in the newsagents – and save money too!

ORDER FORM

Please send me the next 12 issues of.

☐ Atari ST User 9100 ☐ Amiga Computing 9532 ☐ PCA 5437

Please tick your selection and payment method. ** UK only*

☐ Cheque for £19.95 per subscription made payable to Database Publications

☐ Access/Visa account number:

Expiry date /

Signed ____________________

Name ____________________

Address ____________________

____________________ Post Code ____________________

Daytime telephone number ____________________

Send to:
Database Direct, FREEPOST
Ellesmere Port, South Wirral L65 3EB.

MU6

TAPE ONLY

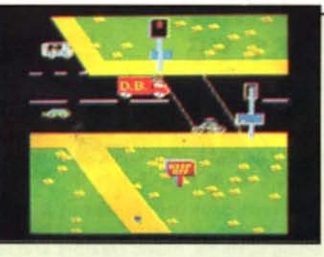
New Educational Bundle

For a limited period we are offering ALL THREE Fun School 1 tapes AND Nursery Rhymes in a special educational bundle for just £9.95 – saving you well over £10!

FUN SCHOOL!

Ages 2-5

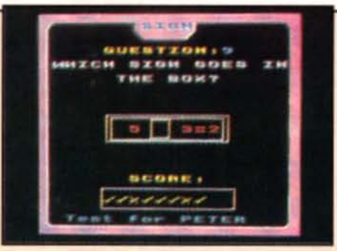
Alphabet
Colours
Counting
House
Magic Garden
Matchmaker
Numbers
Pelican
Seaside
Snap



PELICAN
Teach your children to cross the road safely at a Pelican crossing

Ages 5-8

Balance
Castle
Derrick
Fred's Words
Hilo
Maths Test
Mouser
Number Signs
Seawall
Super Spell



SIGN
QUESTION: 9
WHICH SIGN GOES IN THE BOX?
SCORE:
Test for PETER

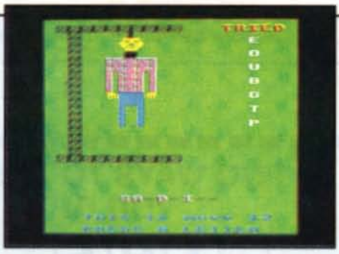
NUMBER SIGNS
Provide the correct arithmetic sign and aim to score ten out of ten

- **Use your Electron to teach and amuse your children at the same time.**
- **Three packages crammed full of educational programs – and so easy to use!**
- **Each program has been educationally approved after extensive testing in the classroom.**

RRP £20.80
OUR PRICE
£9.95

Ages 8-12

Anagram
Codebreaker
Dog Duck Corn
Guessing
Hangman
Maths Hike
Nim
Odd Man Out
Pelmanism
Towers of Hanoi



HANGMAN
Improve your child's spelling with this fun version of the popular game

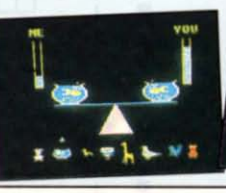
NURSERY RHYMES

5 fun-packed educational programs . . . for young children everywhere

This delightful collection of programs is based around children's favourite Nursery Rhymes. There's plenty of sparkling colour, sound and captivating animation to keep them riveted – and as they play they'll be learning all the way.

- ★ Tell the time with Hickory Dickory Dock.
- ★ Assemble the jigsaw in Humpty Dumpty.
- ★ Learn to spell with Jack and Jill.
- ★ Match the animals in See Saw Marjory Daw.
- ★ Play an exciting game in Hey Diddle Diddle.

Type the word now!
Went



TO ORDER PLEASE USE THE FORM ON PAGE 135

B B+ M A

Gene genie

Evolution in a microcosm with Mark de Weger

GENETICS is a fascinating subject, but quite difficult to represent in any degree of depth on a micro. Here's a program that will run on any BBC Micro and let's you simulate a limited form of life and produces a graphical result of the final population. To be able to use the routine fully it helps to have some knowledge of the basic principles of evolution and genetics as proposed by Darwin and Mendel.

The program sets up a population of creatures which have one fenotype – a visible characteristic such as skin colour, which is the one in this program. The fenotype is determined by two genes located on different chromosomes and there are five different variations – alleles – of a gene.

The fenotype is given by a number varying from zero, completely white, to eight which is black. The numbers in between denote different shades of brown. Each of the two genes of an organism can have a value from zero to four and the fenotype is determined by the sum of the values of the two genes – none of the alleles dominates another.

The program simulates sexual reproduction: Every *father* and *mother* gets four *children* after which they die. The gene values of the children are determined by making use of Mendel's laws with no complicated things like crossing over which we'll look at later. There is also an option for mutations.

The program is quite short – just over 4k – so type it in and clear any typing errors with Get it Right! If you use a colour monitor or TV set, switch it to black and white before running the program to get a better impression of the shading.

You are first asked for the number of creatures that should populate generation zero. Then you have the option of entering the gene values for the organisms. Give two values – from 0 to 4 – for each.

The next stage is to specify the number of generations the program should run for. The choice of *shuffling* members of the population is interesting. If you don't shuffle fathers and mothers will be neighbours – even brothers and sisters – which can be useful for certain types of simulation. However shuffling ensures a random *hit* of father and mother which is generally more realistic.

Answering no to the question of rivalry – natural selection – results in the population doubling in size each generation. But with natural selection each new generation will be the same size as the old one – half of the population dies, perhaps because there is only food to feed a certain number. You can also allow a population to grow for some generations before rivalry comes into effect.

The next question is whether the law of survival of the fittest should be applied. An answer of No means that the members die randomly, otherwise the weaker members are removed. In this program the lower the fenotype number the weaker the creature is.

Finally you are asked to enter the chance of a mutation when two parents get a child. In most instances enter zero, but for certain types of

Turn to Page 62 ▶

◄ **From Page 61**

simulations it might be set to 5 or 10 per cent.

After this initialisation the program starts its main work simulating every new generation according to the specifications you give, until it has reached the number of generations you specified. If the population becomes large or survival of the fittest is applied this can take a while and gives you an excuse to learn assembly language or to buy an Archimedes.

When the final generation has been calculated the mean of the fenotypes of all members of the population is given. After that, you may look at the fenotype values – the numbers from 0 to 8 which represent darkness – of the individual members of the population.

ROSE BY ANOTHER COLOUR

Many text books about genetics use the example of the red rose crossed with a white one. The red rose has two genes – both *A*s – and the white rose also has two genes – both *a*s. The descendants of these in the first generation are all pink: Fenotypes *Aa* and *aA*.

However, the next generation consists on average of 25 per cent red roses, 25 per cent white roses and 50 per cent pink roses:

	A	**a**
A	AA	Aa
a	aA	aa

This is easy to simulate with our program. The only difference is that here the genes don't take two values but five – zero to four. We set a gene value to 4 to denote an *A* and to 0 to denote an *a*. So run the program and answer the questions as follows (your input is highlighted):

```
No. of members of generation 0:  2

Enter gene values?  Y

Gene values of no. 0 (0-4)
 Chromosome 1,2:  0,0

Gene values of no. 1 (0-4)
 Chromosome 1,2:  4,4

Number of generations to evaluate:  1

'Shuffle' members of each new generation?  Y

Is there rivalry?  N

Chance of mutation in percents:  0
```

We create one completely white parent – fenotype values 0,0 – and one completely black one – 4,4.

When the program has run you will be able to see that the fenotypes of all creatures are equal to four – exactly between 0 (aa) and 8 (AA). Just as all roses of the first generation are pink, our simulated roses have a medium brown colour – exactly between black and white.

Now rerun the program and answer the questions as above, with the exception that you should now opt for two generations to be evaluated. If you do this a few times, you will see that on average the fenotype numbers of the members of the second generation are zero (white) in 25 per cent of the cases, eight (black) also in 25 per cent of the cases and four (brown) in 50 per cent of the cases, exactly as expected.

Survival of the fittest

Opt for two members of generation zero and enter gene values like 2,3 or 4,0 for the creatures. Then tell the program to evaluate five generations, to shuffle the members of each new one and opt for rivalry. Make this begin after generation two.

Specify survival of the fittest and enter zero when asked for the chance of a mutation. When the program has evaluated generation five most fenotype values will probably be a lot higher than the expected four. The darker creatures have survived.

Then rerun the program with the same parameters, but don't implement the survival of the fittest. Now also a lot of light-coloured creatures will exist – survival was just random.

It is very interesting to see how mutations can influence a population – especially when only the fittest survive. However, these and lots of other experiments are left to you.

Enhancing the program

The program is quite structured and heavily annotated with REMs, so you can easily see how it works. The only thing that may require further explanation is the way data is stored.

The data of each member of the population is stored in the memory array *bio%*. Each byte represents a creature and the number of bits set in the first four gives the first gene value; bits four to seven are the other.

In the program 150 bytes are reserved for the population but this can be increased easily by changing the value of the variable *maxmem* at the start. On BBC Micros with shadow screens or the Archimedes you can increase this considerably.

The program as it stands is only a basic simulation. However, all major tools are available and it is not very difficult to add extra code for crossing over or different and changing environments for populations to live in.

```
   10 REM Evolution simulation
   20 REM By Mark de Weger
   30 REM (c) The Micro User
   40 :
   50 MODE 7
   60 maxmem=150
   70 DIM bio% maxmem,bio2% maxmem*2,cl%
(8)
   80 PROCinit
   90 FOR gen=1 TO max_gens
  100 PRINTTAB(0,1);"Calculating generat
ion ";gen;"..."
  110 IF (mmbrs*2+1)>maxmem PRINT'"Popu
lation too large.":END
  120 PROCnext_gen
  130 IF starvation AND gen>die_gens PRO
Cindent_starvation ELSE mmbrs=mmbrs*2+1:
PROCindent_nostarvation
  140 IF shuffle PROCshuffle
  150 NEXT
  160 PROCconvert(mmbrs)
  170 PROCanalyse(0,mmbrs)
  180 MODE 130
  190 PROCgraphical
  200 IF FNyes("Another simulation? ") T
HEN RUN
  210 MODE 7
  220 END
  230 :
  240 DEF PROCinit
  250 REM Asks for options and initialis
es generation 0
  260 die_gens=0
  270 @%=&904
```

Turn to Page 65 ►

NEW! TEN of the BEST! EDUCATIONAL GAMES

Packed full of some of the best educational games from the pages of *Electron User*, the new Ten of the Best Educational Games is the ideal way for your children to learn about maths, spelling, anagrams, telling the time, general knowledge, and even the rudiments of running a business!

Specially compiled by the *Electron User* team to give a good grounding in all aspects of learning, and at the very special price of only £5.95 on tape, or £6.95 on 3.5in disc, this collection is a treat you and your children cannot afford to miss!

Give your children hours of fun, and help them to learn the easy way by ordering your copy today.

Crocodile Tears
HUNGRY HARRY
Dozer Disorder
Company Count
Yule Spell
PR.T.ER

THE PROGRAMS

Company Count – Work your way up through the company starting off as a messenger, and ending up as president!

Hungry Harry – Find out what it's like to be an assistant in a busy shop. Can you work out the correct change to give the customers?

Lemonade Stall – Try your hand at running a lemonade stall at a popular seaside resort.

Dozer Disorder – Fill in the missing letters after they are bulldozed into a pit.

Crocodile – Unscramble the letters of a word before the crocodile gets you.

Snail Trail – See how good you are at general knowledge in this trivia quiz.

Hiss – Improve your spelling by guiding a snake round the garden eating up words in the right letter order.

Maths Fun – Test your powers of mental arithmetic.

Odd One Out – Pick the object that doesn't fit from the list of five.

Yule Spell – Guess the hidden word or you'll lose your Christmas presents!

Tape	Disc
£5.95	£6.95

Order your copy today, using the form on Page 135

THE *MOST* ABSORBING ANIMATION PACKAGE MONEY *CAN* BUY.

◆

Imagine–3 Dimensional Graphics coming to *life* before your eyes.

Imagine–quality so *high* that every reflection is so perfectly calculated, it is exactly as you would see it in *real life.*

Imagine–a graphics manipulation package that will *transform* your *computer.*

RENDER BENDER

Allow us to introduce *Render Bender,* a breakthrough in the Computer Animation Market, enabling you to construct *3-D scenes* and *objects* using *Ray Tracing* Methods.

It's easy! First, you create a ray traced scene. Each pixel on the screen then takes all relevant *light sources* and *reflections* into account. The scene is then absolutely correct according to the *laws of physics and optics.*

So when animated, any surface you include will represent the scene around it, whether *reflective* or *non-reflective,* and will contain any light source, colour or shade with *complete accuracy.*

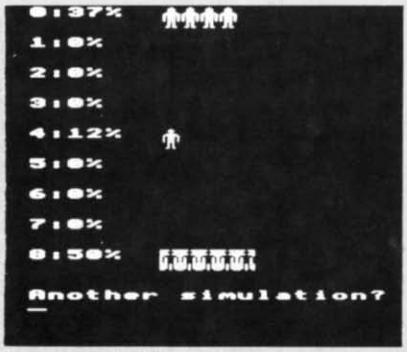
Movement is also achieved *quite simply.* Once a picture is created, variables can easily be included which will in turn produce a sequence of scenes. They are then processed in the *Delta Animator* which creates a moving sequence in a *highly compact form* which can then be viewed. The animation can also run independently using a simple program which even allows you to add your own sounds. *It's stunning!*

So with *Render Bender* there's no limit to your *creativity,* from your own computer graphics to your very own *motion picture.*

Imagine–you could be sitting in a *director's chair* next.

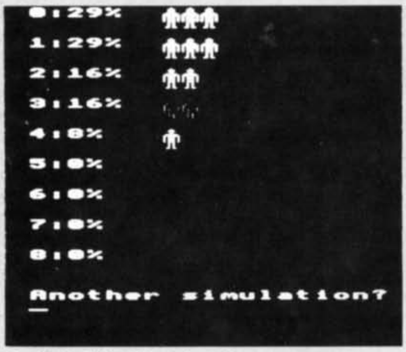
CLARES
MICRO SUPPLIES
98 Middlewich Road, Rudheath, Northwich, CHESHIRE CW9 7DA.
Telephone: 0606 48511 Fax No: 0606 48512

RISC OS COMPATIBLE



```
0:37%
1:0%
2:0%
3:0%
4:12%
5:0%
6:0%
7:0%
8:50%
Another simulation?
```

Roses are red, white or pink



```
0:29%
1:29%
2:16%
3:16%
4:8%
5:0%
6:0%
7:0%
8:0%
Another simulation?
```

Survival of the fittest in action

◀ *From Page 62*

```
  280 PRINT'"Evolution simulation"
  290 PRINT"===================="
  300 PRINT'"By Mark de Weger"
  310 INPUT '"No. of members of generat
ion 0: "mmbrs
  320 IF mmbrs/2<>INT(mmbrs/2) PRINT"Mus
t be even":GOTO 310
  330 mmbrs=mmbrs-1
  340 IF FNyes("Enter gene values? ") FO
R L%=0 TO mmbrs:PRINT"Gene values of no
. ";L%;" (0-4)":INPUT" Chromosome 1,2: "
a,b:bio%?L%=FNbyte(a)+16*FNbyte(b):NEXT
ELSE FOR L%=0 TO mmbrs:bio%?L%=RND(256)-
1:NEXT
  350 INPUT '"Number of generations to e
valuate: "max_gens
  360 PRINT'"'Shuffle' members of each n
ew";
  370 shuffle=FNyes("generation? ")
  380 starvation=FNyes("Is there rivalry
? ")
  390  IF starvation INPUT "After how ma
ny generations? "die_gens:strongest=FNye
s(CHR$11+"Survival of the fittest? ")
  400 INPUT '"Chance of mutation in perc
ents: "chance
  410 IF chance=0 chance=1E9 ELSE chance
=100/chance
  420 VDU 23,210,&1C08;&081C;&7F3E;&5D5D
;
  430 VDU 23,211,&5D5D;&145D;&1414;&3614
;
  440 man$=CHR$210+CHR$8+CHR$10+CHR$211+
CHR$11
  450 CLS
  460 ENDPROC
  470 :
  480 DEF PROCnext_gen
  490 REM Puts members of new generation
 into array 'bio2%'
  500 FOR L1%=0 TO mmbrs STEP 2
  510 FOR L2%=0 TO 3
  520 bio2%?(L1%*2+L2%)=FNchild(bio%?L1%
,bio%?(L1%+1))
  530 NEXT:NEXT:ENDPROC
  560 :
  570 DEF PROCindent_nostarvation
  580 REM Puts members of new generation
 back into array 'bio%'
  590 FOR L%=0 TO mmbrs
  600 bio%?L%=bio2%?L%:NEXT:ENDPROC
  630 :
  640 DEF PROCindent_starvation
  650 REM Puts half of members of new ge
neration back into array 'bio%
  660 REM The other half 'dies'.
  670 IF NOT strongest PROCindent_nostar
vation:ENDPROC
  680 bit=9
  690 bio_cnt=-1
  700 REPEAT
  710 bio2_cnt=-1
  720 bit=bit-1
  730 REPEAT
  740 bio2_cnt=bio2_cnt+1
  750 IF FNbits(bio2%?bio2_cnt)=bit bio_
cnt=bio_cnt+1:bio%?bio_cnt=bio2%?bio2_cn
t
  760 UNTIL (bio2_cnt=mmbrs*2+1) OR (bio
_cnt=mmbrs)
  770 UNTIL bio_cnt=mmbrs
  780 ENDPROC
  790 :
  800 DEF PROCshuffle
  810 REM Randomly shuffles members of p
opulation (in array 'bio%') to ensure
  820 REM random 'hit' of father and mot
her
  830 FOR L%=1 TO 2*mmbrs
  840 rnd1=RND(mmbrs+1)-1
  850 rnd2=RND(mmbrs+1)-1
  860 temp=bio%?rnd1
  870 bio%?rnd1=bio%?rnd2
  880 bio%?rnd2=temp
  890 NEXT
  900 ENDPROC
  910 :
  920 DEF PROCconvert(end)
  930 REM Converts byte values into numb
er of bits set in byte
  940 PRINT'"Converting results...";
  950 FOR L%=0 TO end
  960 bio%?L%=FNbits(bio%?L%)
  970 NEXT
  980 ENDPROC
  990 :
 1000 DEF PROCanalyse(start,end)
 1010 REM Shows results of evolution-sim
ulation
 1020 sum=0
 1030 sum2=0
 1040 PRINT'"Analysing results...";
 1050 FOR L%=0 TO mmbrs
 1060 cl%(bio%?L%)=cl%(bio%?L%)+1
 1070 NEXT
 1080 FOR L%=0 TO 8
 1090 sum=sum+L%*(cl%(L%))
 1100 sum2=sum2+cl%(L%)
 1110 NEXT
 1120 average=sum/(mmbrs-1)
 1130 REM Evt. more statistical calculat
ions
 1140 PRINT'"Average gene value (0-7):
";average
 1150 PRINT"Print fenotype values of in
dividual";
 1160 indiv=FNyes("members? ")
 1170 IF NOT indiv ENDPROC
 1180 FOR L%=0 TO mmbrs
 1190 PRINTTAB((L% MOD 4)*10),L%;": ";bi
o%?L%;
 1200 NEXT
 1210 PRINT
 1220 PRINT'"Press space..."
 1230 REPEAT UNTIL GET=32
 1240 ENDPROC
 1250 :
 1260 DEF FNchild(father,mother)
 1270 REM Gives gene values of 'child' b
orn from 'father' and 'mother' by
 1280 REM randomly taking allels on 1st/
2nd chromos. from father and from
 1290 REM mother. There is a small chanc
e for a mutation.
 1300 IF RND(1)>.5 child=father AND 15 E
LSE child=(father AND 240)/16
 1310 IF RND(1)>.5 child=child+(mother A
ND 15)*16 ELSE child=child+(mother AND 2
40)
 1320 IF RND(chance)=1 child=child EOR (
RND(256)-1)
 1330 =child
 1340 :
 1350 DEF FNbits(byte)
 1360 REM Returns number of bits set in
'byte'
 1370 bits=0
 1380 FOR bitl=0 TO 7
 1390 IF (byte AND 2^bitl) bits=bits+1
 1400 NEXT
 1410 =bits
 1420 :
 1430 DEF FNbyte(bits)
 1440 REM Returns a number in which 'bit
s' bits are set
 1450 IF bits=0 =0
 1460 byte=0
 1470 FOR bL%=0 TO (bits-1)
 1480 byte=byte+2^bL%
 1490 NEXT
 1500 =byte
 1510 :
 1520 DEF FNyes(text$)
 1530 REM Returns TRUE if 'Y' pressed
 1540 PRINT'text$;
 1550 get$=GET$
 1560 PRINTget$
 1570 =get$="Y" OR get$="y"
 1580 :
 1590 DEF FNround(value)
 1600 REM Rounds off 'value' to the near
est ten
 1610 =INT(value/10+.5)*10
 1620 :
 1630 DEF PROCgraphical
 1640 REM Gives graphical output of resu
lts
```

This is one of hundreds of programs now available FREE for downloading on MicroLink

Turn to Page 66 ▶

◄ From Page 65

```
1650 FOR L%=0 TO 8
1660 cl%(L%)=(cl%(L%)/sum2)*100
1670 NEXT
1680 FOR L%=0 TO 8
1690 READ colour
1700 PRINT;L%;":";cl%(L%);"%";TAB(7);
1710 IF FNround(cl%(L%))=0 THEN 1770
1720 COLOUR colour
1730 IF L%=7 OR L%=8 COLOUR 135
1740 FOR men=1 TO INT(FNround(cl%(L%))/
10)
1750 PRINTman$;
1760 NEXT
1770 PRINT''
1780 COLOUR 7
1790 COLOUR 128
1800 NEXT
1810 ENDPROC
1820 :
1830 DATA 7,3,6,5,2,1,4,4,0
```

Get it right!

```
  10 =    0 0
  20 =    0 0
  30 =    0 0
  40 = 9719 9
  50 = 1092 0
  60 = 289A 6
  70 = 8B29 B
  80 = DEBB 3
  90 = 710B F
 100 = E36D 7
 110 = FFD5 E
 120 = 11DD D
 130 = 3EF2 9
 140 = E69F F
 150 = 2C83 5
 160 = E1FA 3
 170 = FAF0 1
 180 = 74BD 7
 190 = 3BA2 7
 200 = 2DDA 3
 210 = 1092 B
 220 = FD2E 4
 230 = 9719 0
 240 = 40D7 F
 250 =    0 F
 260 = EB3B A
 270 = BED0 D
 280 = 6DB1 7
 290 = 5B5C D
 300 = 30F6 7
 310 = 77BA E
 320 = 8330 6
 330 = 2E6C 3
 340 = 8E91 B
 350 =   C1 9
 360 = 5FF2 0
 370 = A561 9
 380 = B94E 7
 390 = 3A73 7
 400 = D46B 5
 410 = E0A5 1
 420 = 360C 7
 430 = CBAE 0
 440 = F598 6
 450 = 7A16 3
 460 = ED0F A
 470 = 9719 3
 480 = 9B12 0
 490 =    0 0
 500 = C558 C
 510 = 1FF7 F
 520 = A906 0
 530 = BB05 6
 560 = 9719 9
 570 = 28C1 A
 580 =    0 A
 590 = DAA0 D
 600 = 6B19 2
 630 = 9719 9
 640 = 4AE0 9
 650 =    0 9
 660 =    0 9
 670 = 7A7B 3
 680 = 2781 F
 690 = 8554 C
 700 = BFBA C
 710 = F744 B
 720 = 6B61 6
 730 = BFBA 4
 740 = BB6F B
 750 = 1E1C F
 760 =  1CD 5
 770 = CE35 0
 780 = ED0F F
 790 = 9719 2
 800 = FAF8 9
 810 =    0 9
 820 =    0 9
 830 = AB4C 1
 840 = 1A16 1
 850 = 97B5 8
 860 = 807A 0
 870 = AA19 3
 880 = 7F01 3
 890 = 2C83 B
 900 = ED0F 4
 910 = 9719 E
 920 = CE14 3
 930 =    0 3
 940 = 9970 8
 950 = E00C F
 960 = 49C6 2
 970 = 2C83 8
 980 = ED0F A
 990 = 9719 3
1000 = CAAE 7
1010 =    0 7
1020 = 91C4 0
1030 = 3BA6 1
1040 = 2D28 7
1050 = DAA0 C
1060 = 8D84 7
1070 = 2C83 F
1080 = F5AA F
1090 = F9F2 0
1100 = BFE1 6
1110 = 2C83 B
1120 = 96D0 5
1130 =    0 5
1140 = A7E3 5
1150 = 84AF B
1160 =  A3D D
1170 = 5DD0 6
1180 = DAA0 2
1190 = A685 2
1200 = 2C83 3
1210 = FF3E F
1220 = 81E5 7
1230 = 2B9E E
1240 = ED0F 8
1250 = 9719 B
1260 = 326E 6
1270 =    0 6
1280 =    0 6
1290 =    0 6
1300 = FFA9 C
1310 = B399 C
1320 = DE57 2
1330 = 2D4F 9
1340 = 9719 9
1350 = 73CA 5
1360 =    0 5
1370 = 29BE A
1380 =  AB3 1
1390 = FC4F B
1400 = 2C83 1
1410 = 16BD 0
1420 = 9719 B
1430 =  418 F
1440 =    0 F
1450 = 91BC 6
1460 = DC27 D
1470 = 5EB5 9
1480 = 3EE3 6
1490 = 2C83 C
1500 = 2729 2
1510 = 9719 1
1520 = 9B82 C
1530 =    0 C
1540 = 8A3E 1
1550 = 4A8C 5
1560 = 4D18 F
1570 = 24CF B
1580 = 9719 6
1590 = 33A7 2
1600 =    0 2
1610 = 9003 B
1620 = 9719 4
1630 = C460 5
1640 =    0 5
1650 = F5AA F
1660 = BE1C E
1670 = 2C83 9
1680 = F5AA E
1690 =  E10 3
1700 = 1539 8
1710 = 4098 7
1720 = 10CA D
1730 = 6EF3 E
1740 = 4F74 3
1750 =  EAC 8
1760 = 2C83 4
1770 = 1F96 E
1780 = 53F1 8
1790 = C2DE 6
1800 = 2C83 8
1810 = ED0F F
1820 = 9719 1
1830 =   8F 5
```

VOLTMACE

Archimedes
COMPATIBLE

COMPATIBLE

● DELTA 3B TWIN

DATAPAD 16B
£39.95

16 Way keypad
Metal case
Software allows the
keys to be defined
Fits onto the user port

FOR A BBC A, B, B+, MASTER, ARCHIMEDES & ELECTRON PLUS 1
DELTA 3B TWIN – £21.95
2 joysticks wired to one plug.
As with all our joysticks they have the fast action sprung to centre return of the steel shafted nylon covered joystick. The light action makes them ideal to hold and the 3 fire buttons allow left or right-handed use.

DELTA 3B SINGLE £14.95
A single joystick that in some ways can act as two. The custom made potentiometers are wired so that it will work as a left hand or right hand joystick. It can run some programs written for two joysticks and has two independent fire functions.

SPECIAL OFFER:
We have acquired a few more Cumana Touchpads, absolute giveaway at £14.95

TEAC 40/80 TRACK SWITCHABLE 5.25" DISC DRIVES

Bare Drives fitted with a switch on the front £80.00
As above, cased with BBC leads £95.00
As above, with power supply £115.00
Archimedes interface with back plate £39.95
Watford D/D DFS kit £44.85
DFS Manual £6.95

REPLACE 5.25" DRIVES WITH 3.5"

Panasonic 400/800k grey fronted 3.5" DS Drives on
Carrier plates to replace 5.25" Drives £80.00

UNBRANDED GUARANTEED DISCS

10 5.25" 40Tr Double sided £4.95
10 5.25" 80Tr Double sided £4.95
10 3.5" 135TPI – DS/DD £10.95
Disc-Drive head cleaner kits – Liquid type – non-abrasive 3.5" or 5.25" £3.95

ACCESS

All prices include VAT + P&P
Joysticks are available from
your dealer or direct from us on
(0462) 894410
Special offers only available direct

VISA

Unit 9, Bondor Business Centre, London Road, Baldock, Herts. SG7 6NG. Telephone (0462) 894410

Big step Forth

Mike Cook takes a look at a powerful Archimedes implementation

Program: RiscForth
Price: £99.95
Suppliers: Silicon Vision, Signal House, Lyon Road, Harrow, Middlesex HA1 2AG.
Tel: 01-422 2274

WHEN RiscForth arrived in the office I pounced on it quickly. As regular readers will know, Forth is my favourite language and this is the first implementation I have seen for the Archimedes. On opening the plastic box I was faced with a single disc and a 146 page A5 size spiral bound manual. The latter is split into 12 chapters, each having its own page numbers but, as there is no contents page or index, finding your way around is not as easy as it could be. Also the pages are so tightly held by the spiral binding that the paper tends to fold back on itself when turning over the pages.

The manual makes no concessions to a beginner – quite rightly as there are many excellent introduction texts available – and I would advise anyone starting on this language to acquire a beginner's book at the same time as buying RiscForth.

Not to worry, in with the disc and boot up and you get the familiar Forth prompt OK, and a few simple tests soon showed that this was quite a fast version of the language. For example, the standard Sieve of Erastosthenes calculated 1,899 prime numbers in 0.414 seconds. For comparison I powered up my Macintosh version of Forth, which is quite fast, and the results were very impressive as you can see from the table. So it's a definite winner on speed.

The next thing I tried was the editor. All versions of Forth have a standard line editor which was designed for use on old hard copy terminals. Quite honestly it is a pain to use but, thankfully, RiscForth has a full screen one. This can only be described as unexcitingly adequate as it uses cursor keys to move around, not the mouse, and it has cryptic control key combinations. This is very similar to the editor I used on my old TRS80 more than 10 years ago.

In contrast, the Macintosh editor is from a different planet, being windowed and fully mouse-driven, although RiscForth has the great advantage of being able to process text files so you can prepare them with any editor you like. This is not quite as good as it sounds because it means that you have to leave the Forth environment to edit your files and then return, which negates the great advantage of Forth – its interactiveness.

The language itself is Forth-83 standard with quite a few extensions. The basic word is 32 bits wide and like the Risc chip is byte addressed – a much better configuration than some Forths I know. It is also case sensitive, again unlike some Forths, and communication is possible with the operating system using *(to preface any OS command. This is most useful as it means you are not isolated from the operating system.

Forth is an extensive language and RiscForth has the usual extensions, Risc assembler, single step debugger and floating point number handling. However in addition it has a multitasking capability handled on a round robin basis. This is done by including the word PAUSE in each task to pass control to the next.

This allows any task to have as much time as it needs and only to pass it on when necessary. This is the same sort of scheme used in RiscOS 2.0 to handle multitasking and while it is quite simple there are some rules you should follow to prevent the system from crashing. All is explained in the manual.

Perhaps the most exciting aspect of RiscForth is that it can generate stand-alone code simply. This means that you can write your program and distribute it to others without them needing the language. Also it is an ideal way of protecting your ideas as disassembled Forth is not very readable to say the least. Silicon Vision quite sensibly does not require any royalty from any stand-alone code you sell or give away.

RiscForth	MacForth	Test
0.06 sec	1.8 sec	32,767 times round an empty loop
0.33 sec	5.3 sec	As above but squaring the loop counter
0.76 sec	17.5 sec	As above but dividing 32767 by the loop counter

Some simple speed tests

Perhaps the most disappointing aspect of the implementation is the lack of support for the wimp system. All it has is the wimp calls defined as words. As RiscForth is not running under the system it is difficult to develop an application using wimps.

That's not to say that it is more difficult than using any other language. It's just that my Macintosh Forth does run under the wimps system and developing wimp based applications is so easy. As Forth is extensible there is no reason why someone shouldn't develop a wimp supporting version, and if they do I will be first in the queue.

All in all, this is a rather good implementation of Forth, fast, with some nice extras. While I wouldn't say it shines, it is certainly worth the money and allows you to run the only really decent language on this more-than-decent micro. Go out and buy it, I say so.

Summing up

At present this is probably the best implementation of a language on the Archimedes. It is fast with some nice extras. The manual could have been better. Rightly, it's not for beginners on its own, but an index would have been useful to help you find your way round.

MULTIPLE INPUT/OUTPUT PODULE FOR THE ARCHIMEDES

FED UP WITH BUYING SEPARATE PODULES?
Using surface mounted components and ultra-miniature technologies, a complete I/O system for the Archimedes has been created to fit into a half-height Eurocard.

It includes the following features:

VIDEO DIGITISER
Video digitiser for use with stationary picture sources (2 second scan in MODE 12 and MODE 15. Ideal for video recorders and cameras. This digitises to 256 levels of grey, colour is provided by an optional breakout box.

A MODE 12 picture

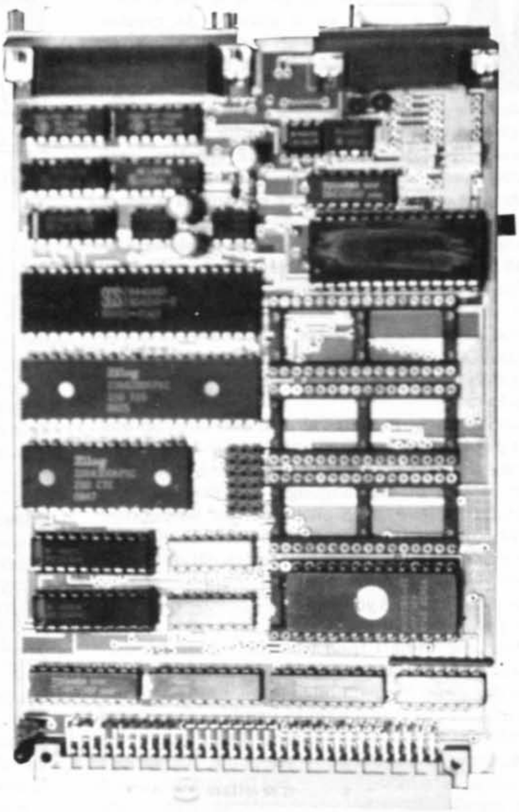
SOUND DIGITISER
A good quality stereo sound sampler with 8 bit resolution.

RS232 INTERFACE
A full RS232 interface is provided with all modem control lines, onto a standard 25 way D connector. +/− 10V levels are used to drive the RS232 lines.

JOYSTICK INTERFACE
A single Dual channel joystick can be inserted and used with the standard 15 way D connector.

ROM SOCKETS
Rom sockets are provided which can accept up to 3 roms, each of which can be up to 128k in size. Software provides for a complete ROM filing system.

Software for the above features is provided on the board, this includes a complete range of SWI's, and star commands.
Price £107 + VAT.



* *

PODULE BREAK-OUT BOX
A box with the standard phono and video BNC sockets which could not be fitted on to the back of the podule. A composite to RGB decoder is also provided for the video digitiser allowing 16 million colours to be digitised.
Price £55 + VAT.

RGB TO COMPOSITE ENCODER
A product designed to interface the Archimedes RGB output to composite monitors and video recorders.
Price £45 + VAT.

4-SLOT BALANCED ADVANCED TECHNOLOGY BACKPLANE
Computer optimised and designed for ultra-reliable operation with podules designed to Acorn specifications.
Price £55 + VAT.
Fan £10 + VAT.

The Multiple Input/Output Podule is available from Technomatic and local dealers.

Due to the high demand for these products we can not accept credit orders, business is on a first-come first-served basis. Payment is by cheque, P.O. or cash. Please add £3 postage and VAT to all the above prices.

BRAINSOFT LTD
106 Baker Street, London W1M 1DF
Telephone: 01-486 0321

FROM YOUR LOCAL DISTRIBUTOR NOW

U·P·D

T·E

School's newspaper featured on TV

BUDDING journalists and newspaper tycoons at Aveland School, Sleaford, Lincolnshire have appeared on television to show how they produce their school newspaper using an Archimedes and a desktop publishing package. The Software Show, screened by the BBC, featured pupils and staff putting their Aveland Arrow newspaper together in one day.

Pupils were organised into production teams for editorial, advertising and finance while eager newshounds went out to search for stories. They visited local businesses and also picked up items from the independent learning centre where national news stories were accessed through online databases. Some leading MPs made contributions. A local printer produced the papers, which were then delivered to newsagents and shops within a 20 mile radius of the school.

Aveland is planning to set up its own resource centre, including Acorn DTP equipment, to strengthen links with the local business community. One of the DTP packages used to produce the newspaper was NewsMaster from LTS (0386 792617).

Pupils producing the Aveland Arrow

Digital music courses on offer

GRANTS are being offered for a diploma course in digital music technology at Keele University. Growing interest in micro-based music has attracted financial support from the European Social Fund and four bursaries of £2,340 each are available for applicants who must be under 25 and unemployed.

They must be familiar with a major computer utility, have musical experience as a performer or composer and must be familiar with recording studios or musical software and synthesisers. Applications should be made direct to the university.

Concentration on grant-aid software

ANOTHER educational software house has voiced its concern over the way recent government grants were allocated.

Featured in *The Micro User* in March, the row centred on the Save our Educational Software Industry campaign launched by Mike Matson of 4Mation and Bill Bonham of Sherston Software. They claimed grants restricted to 16 and 32 bit software could have put them out of business.

That report led Margaret Hall, managing director of Science Education Software, to check her sales records and her findings were "rather disturbing". She reports that BBC Micro software sales began to fall off in the past three months as schools concentrated on grant-aided 16 and 32 bit software.

"We are concerned that in many authorities, the old BBC Micros are being de-centralised and placed in the general classrooms when new equipment is purchased for the computer room", said Margaret whose firm sells to secondary schools. "This means that subject teachers, our customers, are being deprived of grant aid when buying software for physics, chemistry, geography and similar subjects. Even though there may be Nimbus or even Archimedes computers in the school, in many cases the machine used for teaching these subjects is the BBC Micro".

Sales figures indicate that two thirds of schools were unable to take advantage of the £1 million in grants because they did not have the right sort of machines.

"The DTI's own figures seem to suggest that there should have been more research into the penetration of Archimedes into schools before such rigid terms were set for the grant", said Margaret. "We are only now receiving a significant number of inquiries about Archimedes ver-

Turn to Page 70 ▶

◀ *From Page 69*

sions, but the grant deadline has passed and I presume schools buying Archimedes will be unable to obtain help in buying software for their new machines.

"Ideally we would like to see the grant extended to cover BBC Micro software, but failing that we need some assurance that the schools which missed out on claiming extra money because they did not have the right sort of machine will be able to get grant aid for additional software in the future".

The right word for sentences

PRISMA Software (0244 326244) has brought out a new educational package for teaching reading, writing and spelling. As a follow-up to its popular Play and Read program, Prisma has now produced Words and Sentences which allows children to build up longer sentences, gain confidence in sequencing and prove that they understand what they read.

There is a printout facility so children can see their sentences on paper and can make their own reading books. An important aspect of Words and Sentences is that it can be used with the minimum of teacher assistance but still allows the teacher to assess the child's reading and comprehension.

"All our software is written for every child to experience success and demonstrate the progress they have made", said Trude Salisbury of Prisma.

"In Words and Sentences there are two ways of entering words – by typing them or children who are unfamiliar with capital letters or the layout of letters on the keyboard can use the arrow keys to indicate a word they want to write. This gives less able children the opportunity to write sentences and see them in print".

There are two packs with different sets of words. Each costs £12.30 including postage and packing from Prisma, PO Box 211, Chester CH1 3YZ.

Snatch upgraded

UNIVERSITIES and colleges using the screen printing and saving program Snatch from 4Mation Educational Resources (0271 45566) can now run the software with four colour printers.

It has been upgraded to work with Epson and Star 9 pin colour ribbon printers plus Canon and Integrex colour ink jet printers. The software is also compatible with Epson and Star 9 and 24 pin mono printers. Snatch costs £23 but existing owners' discs will be upgraded free of charge.

Stretch is a new product from 4Mation for designing and printing posters, signs, headings, labels, badges, fascias, banners and titles. It runs on all 8 bit BBC Micros and costs £26.45.

New programs

A NUMBER of new educational programs have been produced in the North East by Northern Micromedia (091-270 0424). WP Skills in the Classroom is an Inset pack designed to help teachers' word processing skills in the school curriculum. It costs £25 and is also available at special prices bundled with other software.

Enterprise Publishing Kit allows 13 to 19-year-olds to set up and run a publication. It costs £39.50.

Crossword Call-up is for creating crosswords from a database of clues which are linked to subjects and levels. Price £9 for BBC B and Master, £11 for BBC Compact and Archimedes versions. See the review on Page 33.

What's It to You? is a context-free program aimed at the humanities curriculum in secondary schools. BBC B and Master versions £10, BBC Compact £12.

Education gets a discount

ACORN has introduced recommended educational prices for the first time. The discounts for educational customers put the Master 128 at £401.35 and the Archimedes 310 at £828.

"This is excellent value for money while at the same time Acorn is providing additional backup to dealers to support educational sales", said Acorn communications manager Michael Page. "This will ensure that the high level of service and support that the education market increasingly depends on as schools gain greater autonomy in their financial affairs will be maintained and extended".

IMPRESSION

THE DOCUMENT PROCESSOR FOR THE ARCHIMEDES

Why buy a word processor and a DTP program, when there is a program that does both superbly?

Computer Concepts Ltd

Gaddesden Place
Hemel Hempstead
Herts HP2 6EX
Tel. 0442 63933

Contact us for details of price & availability

Send a

FAX

on your micro!

Now you can use a BBC Micro (or any other computer) to send correspondence in seconds to ANY of the many millions of fax machines in ANY part of the world.

And if you want you can send the same fax to up to 500 different addresses simultaneously.

All you need, in addition to your computer, are a telephone, a modem – and a subscription to MicroLink.

Fax is just another of the many new services now available on MicroLink, Britain's fastest-growing electronic mail provider.

MicroLink *electronic mail and much, much more!*

Details from 0625 878888

WORLDS WITHOUT WORDS

SNATCH

STRETCH

DINOSAUR DISCOVERY

BIG CALCULATOR

DRAGON WORLD

ZOOPAK

BOX OF TREASURES

BUSH RESCUE

TELE-BOOK

SEND A5 22p SAE FOR BROCHURE OF OUR RANGE
OF QUALITY EDUCATIONAL SOFTWARE PACKAGES
4MATION EDUCATIONAL RESOURCES, LINDEN LEA,
ROCK PARK, BARNSTAPLE, DEVON EX32 9AQ. TEL: 0271 45566

GRANNY'S GARDEN

FLOWERS OF CRYSTAL

4 Mation

FREE

with every computer we sell . . .

. . . our expertise!

If you are buying a new Archimedes or Master Series computer, you don't expect to know all about it from day one. That's where we come in. We don't leave our customers high and dry with their problems – they know they can rely on us to get them out of trouble. Whether it's hardware or software, we're the people who know.

BRITISH BROADCASTING CORPORATION MASTER SERIES MICROCOMPUTER

Acorn R140 Unix Work-station

Cambridge Z88 Portable

THE DATA STORE

6 Chatterton Road, Bromley, Kent
Tel: 01-460 8991. Fax 01-313 0400
(closed Wednesday)
An old-fashioned specialist computer shop

Something of an omelette

A software collection that gives pause for thought

Product: Think Ahead
Price: £17.95
Supplier: Fernleaf, 31 Old Road West, Gravesend, Kent DA11 0LH.
Tel: 0474 359037

FERNLEAF'S Think Ahead is a collection of exercises in logic and forward planning that follows on from the Think It Out series of programs. The pack contains five activities aimed at the 7 to 12 years age group, though they will probably have applications at a higher level than that.

Squares is a sliding block puzzle in which children have to make a 2x2 square of similar, not necessarily identical, pictures within a mixed grid of pictures by sliding columns and rows. This idea is extended, as many of the tasks are, to several variations. A starting grid can be 4x4 or 5x5, the number of picture types ranges from two to four and the sequence of moves can be restricted by not allowing the same column or row to be moved successively. There are eight levels allowing children to build strategies based on the simple set-ups and apply them to the more complex forms of the game.

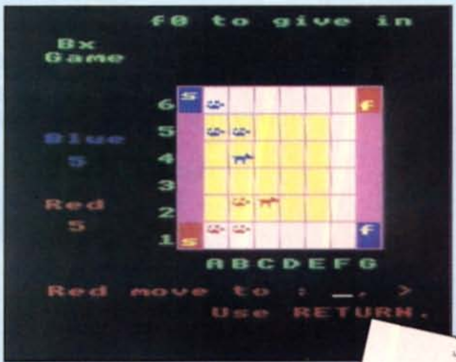
Auctions sets groups bidding against each other for clocks, and the winning team is the one that has managed to buy two or three more clocks than the others, depending on how many are playing. The problem-solving part of this is extended by causing groups whose bids are unsuccessful to lose the money they put up anyway.

In many ways the micro's role here is rather trivial and it is the sort of game you might expect to enjoy more using paper and pen and a live auctioneer. However, the program manages the simulation well and allows it to be played in a variety of classroom situations that perhaps a live action version would not permit.

Columns is rather complex and constructs a simple column graph using three different pictures. The children, by asking questions, have to construct the graph. Information they need to do so includes which columns are used, how many pictures in each and which pictures they are.

Each column contains an odd picture and its position must be discovered. There are rules about the graph being worked on, how many columns there are, their heights and the way they are grouped. There are also rules concerning the placing of odd pictures.

Once the children have the information they need they are tested on it. Again there are variations on the basic theme to allow development of strategies, but there really are problems with this one. This game is nearly as complicated as it sounds, and the instructions given to the children – and indeed the teacher – are just not up to the task.



Columns in action

The example games that may be called up on screen do not include the odd pictures which only appear in the general rules and it was the odd ones that caused most problems.

THINK AHEAD
LOGICAL THINKING AND REASONING GAMES

Matters are further complicated, by the fact that the questions the player can ask do not, in my copy at least, appear on the screen in the form, or even the order, in which they appear on the information sheet. Bright children working their way through can write their own instructions – maybe this is the intention – but the game, good in itself, is complex enough without these additional hurdles.

Pathways is a very nice team against team game in which they must move across a grid to a target square. However, it is possible for one group to box the other in and each square travelled on scores points, so the one that finishes first is not always the winner. There are nine variations on this game concerning the type of movement available and the size of the grid. This is a thoroughly useful program and will fit into the scheme of things in many classrooms.

Finally, **Collections** involves railway shunting. Two teams must collect a given number of trucks on the back of their engine while trying to stop opponents from collecting theirs. Again the movement of the engines is covered by strict rules, and thinking ahead is the way to success. There are four levels of difficulty here with the added complication that the opening does not seem to follow the rules given.

This is an interesting and rather surprising package in these days of toolkits and simulations, reminding us that there are as yet no rules about the way we should use micros in our classrooms.

Summing up

Although something of a curate's egg – good in parts – this package provides useful extension material for high achievers as well as more general resources for the Thinking Skills and Oracy projects presently running. If you don't have something similar in your library it would be a very useful addition.

Marshall Anderson reviews a sheaf of educational software

Getting down to business

Stock control plays an important role in a classroom environment

Product: Stock Pack plc
Price: £24.95 (all versions)
Supplier: Topologika, PO Box 39, Stilton, Peterborough PE7 3RL.
Tel: 0733 244682

STOCK PACK plc from Topologika is a simple stock control package for use by students working at GCSE or similar level. It is worth pointing out that this is no Micky Mouse package only capable of dealing with a couple of dozen files. It was developed from a program written for a small business in East Anglia where it has done sterling work handling 250 customers and 400 stock records on an unexpanded BBC B with a double sided 80 track drive.

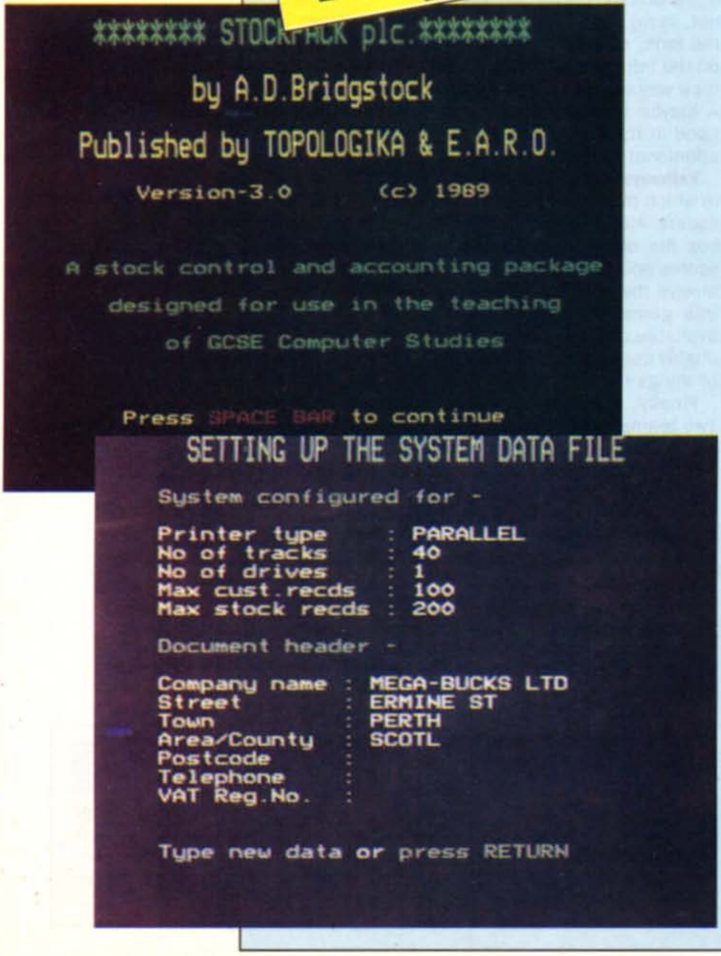
The software comes on a disc which you are invited to backup and put in a safe place and the copy is then used to generate the working discs. Full instructions are provided for setting up the copies for any disc configuration. The package includes a guided tour booklet which explains all in a consistently clear and straightforward manner and will take the sweat out of initial lesson preparation.

First, customer records are set up and the student is introduced to the idea of the Mod-11 data check, a fairly standard form in industry, as part of the customer code. Having given the customer a code the rest of the information is a fairly standard address form. Editing is a little cumbersome on this version as you have to call up the customer records and move down from the top to reach the required field, then it must be entirely re-entered.

Once the customer records are in they may be printed on any Epson-compatible machine. The output routine, a simple but very effective part of this package, selects and thoughtfully uses the print options available: Condensed print for tables, normal for any correspondence and double width for letter heads. If you have a printer that is not Epson-compatible the manual seems to leave you rather adrift.

Now you get to set up a stock file, which is put reassuringly in the same style as the customer file. Each item again has a Mod-11 code number

Stock Levels
Quantity
Cost Price
Min.Re-ord.Quantity
Size
Description
Retail Price
V.A.T.
STOCK PACK plc
GUIDED TOUR
EARO/TOPOLOGIKA



```
******** STOCKPACK plc.********

by A.D.Bridgstock

Published by TOPOLOGIKA & E.A.R.O.

Version-3.0        (c) 1989

A stock control and accounting package
designed for use in the teaching
of GCSE Computer Studies

Press SPACE BAR to continue
```

```
SETTING UP THE SYSTEM DATA FILE

System configured for -

Printer type       : PARALLEL
No of tracks       : 40
No of drives       : 1
Max cust.recds     : 100
Max stock recds    : 200

Document header -

Company name  : MEGA-BUCKS LTD
Street        : ERMINE ST
Town          : PERTH
Area/County   : SCOTL
Postcode      :
Telephone     :
VAT Reg.No.   :

Type new data or press RETURN
```

and, along with this, the file can hold a description of the item, the quantity held, cost and retail prices, size, minimum stock level and the reordering quantity.

The input routine for entering sums of money could have been a little more sensitive, for example if you enter no decimal point the figure entered is assumed to be whole pounds. This is fair enough, but considering the care with which the customer and stock identification numbers are monitored, a more formal proforma might have been expected.

Editing is much the same process as before, and a full table of information can be sent to the printer. Having entered your own company's name you are now in a position to print out a price list which is given a nice letter head and generally made to look quite posh.

It is this kind of touch that gives a sense of reality to the package no matter how theoretical the exercise may be. Having entered all this information you can now go about actually using it.

Sales transactions can be fed straight into an invoice and the customer and other records are automatically updated. For instance, the stock is reduced by the given amount and the customer account debited with the cost of that purchase. You are warned if the level of stock is below that ordered on the invoice but there is no provision for providing a customer with a credit limit.

Outstanding accounts can be listed at any time, including a total owed figure. Items that have dropped below their minimum stock level can also be listed with the total cost of reordering at the preset levels, so you can always get an overview of your position.

Finally, the goods inward and customer remittance section of things allows you to take delivery of items and money from customers. Overall this package seems to have succeeded admirably in sorting out and presenting clearly the main aspects of any stock control program.

Perhaps the only objection that can be levelled at it is in its exclusive use of reference numbers for finding records – you cannot search by name or product. It is unquestionably simple and robust enough to be used in that context much further down the age range. The version reviewed here was for the 8 bit BBC Micros, an Archimedes version is also available and a network one is on the way.

Summing up

This package is certainly capable of playing an important part in GCSE computer studies course as well as related areas. It should also be ideal for keeping track of those mini-enterprise projects springing up all over the place.

Simplicity counts

Product: The Wizard Strikes Back
Price: £14.00
Supplier: Cambridgeshire Software House, The Town Hall, St Ives, Huntingdon, Cambridgeshire PE17 4AL.
Tel: 0480 66805

THE latest from CSH is The Wizard Strikes Back, the sequel to the popular Princess and the Ring. At first sight there seems to be very little to this package in terms of its content: It's the sort of thing that makes you ask yourself if there is something basic you have missed. The answer in this case is yes. Everything is simple, the set of line drawings of characters, the story on both tape and photocopyable sheets and the adventure itself.

A teacher will complete it very quickly: There are no difficult maths problems to solve, no trying to guess the right word or find the missing shape – all you have to do is go from room to room in the right order taking the right objects.

There lies this package's strength – its concentration on the playing of an adventure and the exclusion of all other considerations. Children can devote their energies to developing recording strategies of their own with little or no pre-knowledge. Compass points are little used, so a map will not solve the problem. Some kind of schematic must be developed.

The storyline involves finding a magic sword to cut down the evil weed engulfing the castle. All locations are nicely illustrated and children interact with the software using multiple-choice questions. The plot is developed in a constructive and helpful way, each new discovery leading to a clue for the next problem to be solved, though the order is not prescriptive.

Random elements are introduced with the location in the castle of the weed, which is fine, and the door by which you leave one particular room, but some children found this irritating once they knew where they wanted to go. The narrative also provides plenty of scope for further creative work in art, language and drama by introducing several characters who behave in definite ways in the plot and beg further development.

This will provide all those things you ask of an adventure package for children – promote problem solving, open up discussion in groups, develop recording skills and so on – all in a structured and uncluttered way. It will be especially useful in schools where adventures form a major part of computer work as it can provide a very good grounding for children approaching this type of program for the first time.

Summing up

The software's simplicity allows quick success and feedback, helping children to develop confidence in this kind of activity before facing more cryptic tasks set in other adventures. It's certainly worth a look.

Adventures in maths

A brand new look for a couple of old favourites

ANITA Straker writes solid, useful software with its base firmly in the classroom and ESM has gathered together several of her established adventures, put them into nice boxes and added them to its catalogue. Puff is representative of the kind of thing we have come to expect from this author, a maths adventure for 7 to 10-year-olds based in a Chinese pagoda.

We are asked to find Puff the dragon and on the way there are a variety of mathematical problems to solve. Commands are entered using the old verb-noun convention and common words are available from the function keys.

Directions are left, right, up and down rather than the more usual compass points and this causes problems for children who have Logo experience – they kept asking: *"But which way are we facing?"*.

Moving around the pagoda the children discover a variety of objects like ropes, lamps, gongs and so on which are used to gain entry to areas of the game. The problems tend to be logical, encouraging and rewarding good recording.

A range of mathematical problems is set into the story with varying degrees of credibility. Unlike many other maths adventures aimed at juniors there is no *Answer this tables question to zap the alien* approach. Each problem set is a complete investigation in its own right and unquestionably these will unleash a wealth of activity away from the micro.

They all demand that a strategy be developed for solving and there is little point in just hammering at the keyboard hoping the right answer will appear or that the program will give it to you and let you continue. For example, the children will be asked to guess a number between 1 and 100 and are given seven tries at getting it. Before they start they will need to work out how they will approach this problem to guarantee success.

Product: Puff and Martello Tower
Price: £16.95 (each)
Supplier: ESM, Abbeygate House, East Road, Cambridge CB1 1DB.
Tel: 0223 65445

Similarly with making the biggest number out of four digits when given them one at a time, the children must not only apply their knowledge of place value but have some idea of the chances of a given digit appearing – where would you put a seven if it was the first number presented to you?

Another interesting investigation is that of the coloured paving stones. You are shown the first couple of dozen in a path and have, from there, to predict the colour of the 150th.

Having completed Puff there's also *Martello Tower*, a very similar kind of game set in one of these spooky old places loved by the 9 to 13 years age range. The aim here is simple – to escape – and the program is laid out in much the same way, though less well illustrated, and presents problems of a more difficult order.

Especially notable is the introduction of the Nim game which children can work on for a long time before they get the idea. While Puff can be used with little preknowledge, Martello Tower demands more in the way of preparation and resourcing: Children will need equipment to solve some of these problems. Both packages allow position to be saved, which is very useful.

In a school where maths investigations are the norm – and the national curriculum will soon make that every school – these packages provide a valuable resource, a framework on which to hang them. From that point of view they cannot be faulted, but viewed in a broader sense they are rather unsatisfying. They are several years old now and things have moved on in the production of software since they were written.

The graphics, which are important to children, are disappointing – Mode 7 is not a good environment. The sentence parser is unhelpful: Typing *take the oil* rather than *take oil* produces the message *I don't understand*. It's a shame that nothing was done to the software so that it could have been truly relaunched in the way The Mary Rose recently was.

The same goes for the teacher's notes, which are short and insist on playing the game to find most of the answers – a laudable but not entirely practical aim. Moreover, the narratives are weak and occasionally inconsistent, while the mathematical problems only vaguely related to the environment, although this is a problem few maths adventures ever overcome.

Puff
Martello Tower
Martello Tower
MARTELLO TOWER
Puff
MARTELLO TOWER MAP

Summing up

Both programs represent a worthwhile addition to any school's software base and provide a consistent progression in structure and difficulty. A little more effort in the presentation would have made them indispensable.

AMPSOUND

153a Victoria Street, St. Albans

As pro-audio dealers, we specialise in sound-related products for one of the fastest computers available today – the Archimedes. Its capabilities are endless and we can prove it to you. We even use the system for our own business affairs!

For best Archimedes Prices Please Ring.

So, if you need any advice or information on this, or any other Acorn product call us now. Free bumper catalogue and price list available. Major software/ hardware from Clares, Minerva, Computer Concepts etc.

Armadillo

8 bit sound sampler .... Mono £130.00
Stereo £160.00
Stereo + Midi £190.00
16 bit sound sampler
orders taken now! Pre-launch price £950.00

EMR

Studio 24 + sequencer £99.00
Midi interface (4 in, 4 out) £129.00
Please enquire for other products.

Prices exclude VAT
Payment by Cheque or Access accepted

0727 50075

DOUBLE PHANTOM?

YES! This IS the program demonstrated on BBC TV's "Micro Live". The Worlds first micro multi-user combat flight simulation is now available direct from DOCTOR SOFT via our'HOT LINE' FIRST CLASS MAIL ORDER service.

DOUBLE PHANTOM is basically a TWO computer version of the highly acclaimed PHANTOM COMBAT simulation. At least one BBC must have a disc system. A hardware link (included) then links the machines which become separate aircraft sharing the same airspace, each VISIBLE and VULNERABLE to the other!

DOUBLE PHANTOM has all the usual PHANTOM features including the fastest and smoothest 3D colour graphics around (15fps). RAF Phantom pilot Paul Courtnage's verdict: "Marvellous. . .quite the best micro flight simulation I've ever seen. . .Totally captivating!"

NEW LOW PRICES inc. VAT & 1st class postage

DOUBLE PHANTOM	BBC		disc & cable	9.99
DOUBLE AND SINGLE PHANTOM	BBC		2 discs & cable	12.99
PHANTOM COMBAT	BBC		disc	4.99
PHANTOM COMBAT	BBC B & Electron		cass	3.99
747	BBC B	disc 4.99	cass	3.99
747	Electron		cass	2.99

JOYSTICKS optional with all simulations

also: **GENUINE VERBATIM BRANDED DISCS at VERY LOW PRICES**

Example: 5.25" DS DD 5.99 per 10 box. Phone for details.

Just phone in your VISA or ACCESS No. to:
0903 770044 orders during business hours,
0903 776000 24 hour answerphone orders,
0903 775656 FAX, or send cheque/P.O. to:

DOCTOR SOFT DISC SUPPLIES,
PO Box 66 East Preston, West Sussex, BN16 2TX

ARCHIMEDES QUEST

A New Advanced Information Handling Package

WHAT IS ARCHIMEDES QUEST?

A fast and powerful new version of our very popular Quest data handling package. It has been substantially re-written to run in the Archimedes native 32-bit environment.

WHAT ADVANTAGES DOES ARCHIMEDES QUEST HAVE OVER OTHER VERSIONS?

Very large datafiles – will over 3Mb of data in RAM on an A440, yet Archimedes Quest works equally well on an A305.
Very fast – 7 seconds to count every reference to Hamlet spoken in the first act of the play.
Graphics and statistics built in – bar charts, pie charts, scattergraphs, histograms, percentages and more in full colour. Created quickly and easily on a whole file or selected subsets.
Improved command language – search files using queries like sex is "male" or name starts "Eli" as well as all the commands from the previous versions.
Numerous other improvements as suggested by existing Quest users – for example extra fields can be added, fields can be deleted, serial fields can be created and much more.

CAN I USE DATA FROM OTHER PACKAGES?

Archimedes Quest is fully compatible with existing Quest datafiles. It can import and export data in both CSV and TSV formats allowing interchange with packages such as *Pipedream* and *1st Word Plus*. It also supports the File Interchange Format allowing data to be transferred to and from other machines such as the RM Nimbus.

WHEN WILL ARCHIMEDES QUEST BE AVAILABLE?

Archimedes Quest is available now for only £30. To order Archimedes Quest or for details of any of our products contact:

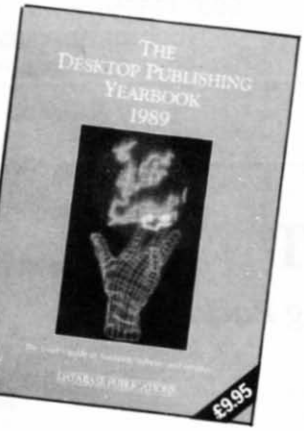
Advisory Unit for Microtechnology in Education
Endymion Road, Hatfield, Herts. AL10 8AU Tel: 07072 65443

EVERYTHING YOU NEED TO KNOW ABOUT DESKTOP PUBLISHING

ONLY £9.95

The Desktop Publishing Yearbook 1989 is an invaluable buyer's guide containing the most detailed survey available of hardware, software and services in the electronic publishing field.

And there are clearly-written "how-to" articles for both the newcomer to Desktop Publishing and the experienced user.



Articles cover single-user and multi-user publishing systems, publishing software, laser and other electronic printers, matrix printers, digitisers and scanners, computer typesetting, magazine and newspaper composition, documents and forms creation, bureau services, word processors, and many other key topics.

Whether you're a beginner or professional and would like to find out more about the exciting possibilities of DTP, then this book has all the information you need. Send for your copy today!

TO ORDER YOUR COPY, PLEASE USE THE FORM ON PAGE 135

CARE ELECTRONICS

800 St. Albans Road, Garston, Watford,
Herts. WD2 6NL. Tel: 0923 672102
For your convenience first price Ex VAT, Second Inc VAT

CARE MASTER SMART CARTRIDGE

At the press of a button halt any program running and execute any one of a host of useful built in, or user defined functions and once completed will return to the program and continue. Built in functions include:- Tape to Disc, Screen Dump to Disc or Printer, Sound On/Off, Autosave and much more £30.00 £34.50c

CARE 32K BATTERY BACKED RAM CARTRIDGE FOR MASTER ONLY

For use as a 32K Sideways Ram or Plug Spellmaster in and have User Dictionary 16K (Battery Backed) all on the same cartridge. With Write Protect Switch and a battery life of approx 10 years £40.00 £46.00c

CARE MASTER ROM CARTRIDGES

Designed by Care Electronics to Acorn specifications to enable the use of 2nd generation ROM. i.e. Interword/Spellmaster etc.

The Care Master cartridges offer 5 options for maximum user flexibility.

1. Dual cartridge takes 2 Rom	£9.00	£10.35c
2. Single Zif takes 2 Rom	£14.00	£16.10c
3. Dual Zif takes 2 Rom	£18.00	£20.70c
4. 32k Switchboard Cartridge for 32K Roms	£12.00	£13.80c
5. Quad Cartridge takes 4 Rom and enables by switching the use of any 2 roms inc Inter Series rom	£12.00	£13.80c
Master Rom Extender for using BBC B Cartridges on the Master–Ideal for schools	£12.00	£13.80c
Morley AA (Internal) Rom Board	£40.00	£46.00d

BBC B ROM CARTRIDGE SYSTEM

BBC B Low Profile Rom System	£12.00	£13.80c
BBC B Spare Cartridges	£3.00	£3.45c

BBC B Cartridges can be used on the Master with the Master Rom Extender–See above

EPROM PROGRAMMER V2

Programs 8K, 16K, 32K CMOS or NMOS devices voltage selectable 21V or 12.5V. Complete with comprehensive software which includes Rom management system, plugs into the user port £30.00 £34.50d

SPECIAL OFFER

MORLEY TELETEXT ADAPTOR

Comes complete with 16K ATS Rom, Manual and utilities Disc at the unbeatable price of £86.00 £98.90b

LABELMASTER

Uses a variety of print styles and sizes. All formatting is done for you and can accept different label sizes. A comprehensive label printing program that is easy to use for BBC B, Master, Compact and Electron–Please state model when ordering £15.00 £17.25c

CARE PRINTER BUFFER

User definable for BBC B, Master on Rom or Disc . £13.00 £14.95c

PRINTER SWITCHERS

Two computers to one printer or vice versa	£25.00	£28.75b
Three computers to one printer or vice versa	£33.00	£37.95b
Four computers to one printer or vice versa	£40.00	£46.00b

Please note that the above units switch all lines, are suitable for all types of printers and computers using Centronics Parallel and INCLUDE LEAD

Six computers to one printer	£60.00	£69.00b
Four to one automatic switcher	£102.00	£117.30b
Eight to one automatic switcher	£128.00	£147.20b

For advice or a quote on your installation please phone

User port switcher 2 to 1 & off	£25.00	£28.75d

CARE READY MADE LEADS RANGE

BBC/Master RGB-Euro (Scart)	£9.00	£10.35c
BBC/Master RGB-7 Pin Hitachi	£7.00	£8.20c
BBC/Master RGB-7 Pin Ferguson	£7.00	£8.20c
Centronics to Centronics Printer	£11.00	£12.65c
User Port Extension lead 0.5M	£9.00	£10.35c
1MHz Bus Extension lead 0.3M	£10.40	£11.96c

Wide range of leads in stock–please phone

Government & Educational orders welcome. How to Order: Enclose your cheque or P/Order made payable to CARE ELECTRONICS. Access or Visa cards welcome Please allow 7 days for delivery. Please add Post & Packing – a=£11.50; b=£3.45; c=£1.38; d=£2.30

We will be closed for the month of August 1989

Nine nines are...

A useful routine for practising tables from Martin Sann

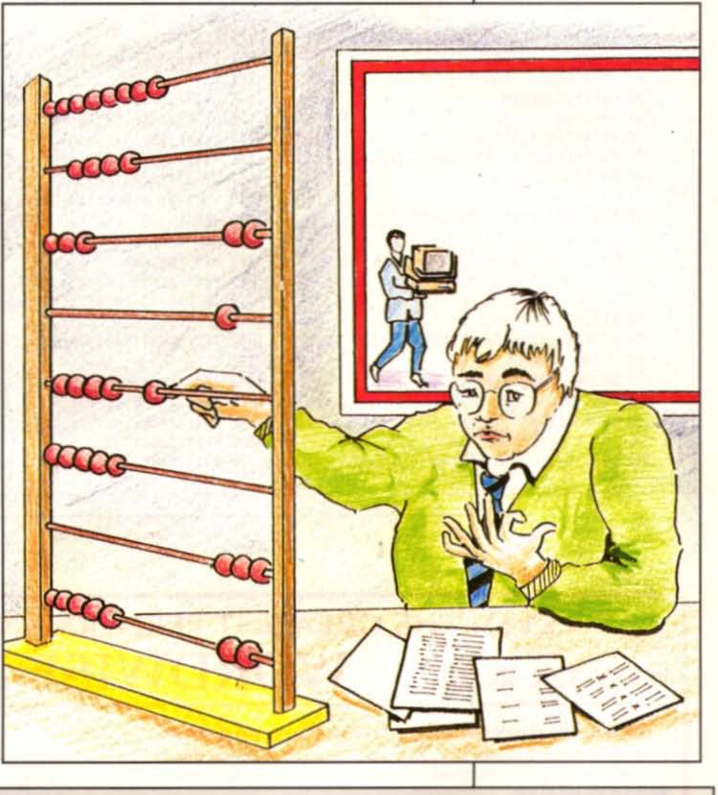
CHILDREN usually find maths tables a bore. They need short bursts of questions, immediate feedback on how they're doing and some way to assess their progress. Table Expert is a pleasant way to carry out this drill and you should find it very useful both at home and in the classroom. Type it in and eliminate any typing errors with Get it Right!

Players are prompted for their name which will be used as a prefix to a number if the results are saved. They can then elect to practise any four tables from 2 to 9 – there's nothing to stop them choosing the same table four times to see how expert they can get – or let the micro choose.

Questions are answered simply by pressing what the player hopes is the correct number – there's no need to use Return. If you're a keen European you'll appreciate the messages of success or failure but if you don't like them they can be altered by changing the data statements at the end of the listing. Keep each word to no more than 10 letters.

When the four tables are completed the program shows the final results, asks if they are to be saved and, after the reply, offers another go. If the player opts to save the results the program does so with the filename followed by 1. After the next go the suffix will be 2 and so on.

You can review the results at leisure by just *TYPEing them. So let your children have fun and learn while they are doing so.



```
  10 REM Table expert
  20 REM by Martin Sann
  30 REM (C) The Micro User
  40 DIM oscli% 40
  50 DIM d%(10),com%(10),rnd%(4),ch%(4)
  60 DIM ok$(9),no$(9)
  70 MODE7:VDU23;8202;0;0;0;:@%=0
  80 *FX4,1
  90 *FX11,0
 100 *FX200,1
 110 FOR N=1 TO 9:READ ok$(N):NEXT
 120 FOR N=1 TO 9:READ no$(N):NEXT
 130 p$=CHR$149+STRING$(39,"p")
 140 £$=CHR$149+STRING$(39,"£")
 150 c$=STRING$(39," ")
 160 bl$=CHR$134+CHR$157+CHR$132
 170 sc=1
 180 PROCinfo
 190 PROCname
 200 PROCinfo1
 210 PROCinfo2
 220 PROCtables
 230 DEFPROCinfo
 240 PROCtop
 250 PRINTTAB(1,7)"This program will he
lp you to become an"SPC(10)"expert at yo
ur tables."
 260 PRINTTAB(1,11)"You can choose four
 tables to do or you"SPC(9)"can let the
micro decide."
 270 PRINTTAB(1,15)"The micro will keep
 a record of your   results which you ca
n save if you want."
 280 PROCtype("Please press the RETURN
key to go on",2,20)
 290 REPEAT UNTIL GET=13
 300 ENDPROC
 310 DEFPROCtop
 320 CLS
 330 PRINTTAB(0,0)£$:PRINTTAB(0,3)p$
 340 PROCdbl(CHR$131+"T a b l e    E x
p e r t",6,1)
 350 PRINTTAB(0,19)p$:PRINTTAB(0,22)£$
 360 ENDPROC
 370 DEFPROCname
 380 PROCtop:PRINTTAB(18,13)STRING$(6,C
HR$255):PROCtype("Please type in your na
me",7,20):name$=FNin(6)
 390 ENDPROC
 400 DEF FNin(i%):LOCAL a$,i$,g%,len%
 410 REPEAT REPEAT g%=GET:a$=CHR$g%
 420 len%=LENi$:IF len%=0 AND g%=13 PRO
Ctype("You do have a name don't you?",5,
20):PROCwait(5):PROCtype("  Please type
in your name   ",6,20)
 430 UNTIL g%=13 OR g%=127 OR (g%>64 AN
D g%<91)
 440 IF g%=13 OR g%=127 ELSE IF len%=i%
 PROCtype("Please press the RETURN key",
6,20) ELSE i$=i$+a$
 450 PRINTTAB(18,13)i$:SOUND1,-10,180,2
 460 IF g%=127 IF i$>"" PRINTTAB(17+len
%,13)CHR$255:i$=LEFT$(i$,len%-1)
 470 UNTIL g%=13 AND len%>0:=i$
 480 DEFPROCinfo1
 490 PROCtop
 500 PROCdbl(bl$+"1 = try some tables
"+CHR$156,7,9):PROCdbl(bl$+"2 = see some
 scores  "+CHR$156,7,13)
 510 PROCget:IF g=1 PROCinfo2 ELSE PROC
load
 520 ENDPROC
 530 DEFPROCinfo2
 540 PROCtop
 550 PROCdbl(bl$+"1 ="+CHR$129+"you"+CH
R$132+"choose the tables  "+CHR$156,4,9)
 560 PRINTTAB(5,11)CHR$150+STRING$(29,"
£")
 570 PROCdbl(bl$+"2 = the "+CHR$129+"co
mputer"+CHR$132+"chooses  "+CHR$156,4,13
)
 580 PRINTTAB(5,15)CHR$150+STRING$(29,"
£")
 590 PROCget
 600 IF g=1 user=1:PROCchoose
```

Turn to Page 80 ►

◀ From Page 79

```
  610 IF g=2 user=2:GOTO220
  620 ENDPROC
  630 DEFPROCget
  640 PRINTTAB(0,20)CHR$131+CHR$157
  650 PRINTTAB(0,21)CHR$131+CHR$157
  660 PROCtype(CHR$132+"PRESS 1 OR 2",13
,20)
  670 REPEAT:g=GET-48:UNTIL g=1 OR g=2
  680 SOUND1,-10,180,2
  690 ENDPROC
  700 DEFPROCchoose
  710 PROCtop
  720 PRINTTAB(0,10)p$
  730 PRINTTAB(0,19)£$:PRINTTAB(0,22)p$
  740 PROCdbl("2    3    4    5    6
7    8    9",2,12)
  750 PROCdbl(CHR$131+CHR$157,8,15)
  760 PROCdbl(CHR$156,31,15)
  770 PROCtype("Please choose FOUR table
s",7,20)
  780 N=1
  790 REPEAT
  800 REPEAT:ch%=GET-48:ch$=STR$ch%:UNTI
L ch%>1 AND ch%<10
  810 SOUND1,-10,148+4*ch%,2
  820 PROCdbl(" ",(ch%-2)*5+2,12)
  830 PROCdbl(CHR$132+ch$,(N+1)*5+1,15)
  840 ch%(N)=ch%:N=N+1:UNTIL N=5
  850 PROCtype("   Are these ok? (Y/N)
",8,20)
  860 PROCyesno
  870 SOUND1,-10,180,2
  880 IF g$="N" OR g$="n" GOTO710 ELSE G
OTO220
  890 ENDPROC
  900 DEFPROCyesno
  910 REPEAT:g$=CHR$(GET AND 95):UNTIL I
NSTR("YN",g$)<>0
  920 ENDPROC
  930 DEFPROCtables
  940 CLS
  950 PRINTTAB(0,0)£$:PRINTTAB(0,3)p$
  960 PRINTTAB(0,19)£$:PRINTTAB(0,22)p$
  970 PRINTTAB(36,4)"sec"
  980 PRINTTAB(0,5)£$:PRINTTAB(0,17)p$
  990 PRINTTAB(2,18)"ok"
 1000 Xpos=0:ok=0:totok=0:totsec=0
 1010 PROCrnd(8):FOR table=1TO4:rnd%(tab
le)=com%(table)+1:NEXT
 1020 FOR table=1 TO 4
 1030 PROCrnd(9):PROCclear(1)
 1040 IF user=1 t$=STR$ch%(table) ELSE t
$=STR$rnd%(table)
 1050 PROCtype(CHR$131+t$+" TIMES",Xpos+
1,1)
 1060 PROCtimes(Xpos,t$+" x")
 1070 PRINTTAB(0,6)c$
 1080 totok=totok+ok:Xpos=Xpos+9
 1090 NEXT table
 1100 PRINTTAB(0,1)c$:PRINTTAB(0,2)c$
 1110 PROCclear(20)
 1120  IF user=1 PRINTTAB(2,6)CHR$134"x
 "+STR$ch%(1);SPC(8);STR$ch%(2);SPC(8);S
TR$ch%(3);SPC(8);STR$ch%(4)
 1130  IF user=2 PRINTTAB(2,6)CHR$134"x
 "+STR$rnd%(1);SPC(8);STR$rnd%(2);SPC(8)
;STR$rnd%(3);SPC(8);STR$rnd%(4)
 1140 FOR N=1 TO 9:PRINTTAB(2,17-N)CHR$1
34;N:NEXT N
 1150 PROCclear(1)
 1160 IF totsec<40 sp$="W O W !"
 1170 IF totsec>40 AND totsec<100 sp$="F
AST"
 1180 IF totsec>100 AND totsec<200 sp$="
FAIR"
 1190 IF totsec>200 sp$="SLOW"
 1200 IF totok=36 sk$="EXPERT"
 1210 IF totok>31 AND totok<36 sk$="MAST
ER"
```

MAJOR VARIABLES

name$	Your name
ch%()	Your choices
com%()	Micro's choices
rnd%()	Random numbers
sc	Results screen number
totok	Total correct answers
totsec	Total time taken
t$	Table being tested

EVEN THE GREATEST PERFORMANCES CAN BE IMPROVED

NEW 32K ROM **WORDWISE PLUS II** For model B, B+ and Master

All the features of Wordwise Plus, and more. . .

Produced with the co-operation of Computer Concepts, Wordwise Plus II (WW+2) is a complete word-processing system which is easy to fit and straightforward to use.

Simply remove your existing word-processor chip (if any), and plug in the WW+2 ROM. One command, and you immediately have a very powerful word-processor system.

The red function keys are used to full effect, with a keystrip showing the purpose of each one. WW+2 is equally at home with a short letter, or a complete book.

Many operations are menu driven, so that the user is always prompted when necessary. Because it's so user friendly, it makes an ideal choice for anyone rather apprehensive about word-processing.

At the same time, WW+2 has all the features of many more expensive programs. Automatic headings and footings, page/line numbering, word counts etc. Move, copy and delete operations on text are vital in text editing, and simplicity itself.

WW+2 works with any BBC compatible printer, and that means most dot-matrix, daisy wheel and laser printers. There are no hidden extras needed in the form of special printer drivers.

What other word-processing package provides you with everthing you need to do fast address sorting, mail-shots, print information onto sticky labels, write documents of virtually unlimited length ("continuous processing") etc?

We have received many letters of praise from WW+2 users, and are grateful for permission to quote the following;

". .every bit as good as I was led to believe. So good, indeed, that I would recommend all Wordwise Plus users to upgrade to WW+2." **D Sims, Cambridge.**

". .excellent additions to an already outstanding piece of software."

"The WW+2 ROM alone is superb, and the extra utilities make it very good value."

See also page 139 BBC Acorn User April 1989.

Upgrades from Wordwise/Plus are available.

Some of the new WW+2 extensions

Many Interword-type features are present, such as menu driven loading and saving of text. Over 12 extra CTRL keys are provided to delete a line, mark a word or paragraph, search for a given string etc. Search and replace operations can now be performed directly from edit mode, and on segments too. You can switch between the text area and any segment with just a single key press instead of five.

A "help" menu is available to tell you which key does what.

Loading and saving of text is about 10 times faster than Wordwise. Full safety prompts make it almost impossible to lose text by accident. Fully compatible with ADFS.

Naturally, existing user of Wordwise/Plus will find that their text files and segment programs are 100% compatible with WW+2. The programming language has over 30 new keywords and is much faster than Wordwise Plus.

Programs supplied

Provided with WW+2 are two discs of example programs.

Programs on disc have the advantage that they may be changed to suit the users needs, and include a fast sorting routine, printer buffer, mail-merge program, label printer, and many other utilities.

A more detailed information sheet is available upon request.

Thousands of users still prefer the Wordwise system. You can order WW+2 by credit card on (0752) 847286. Or send c.w.o. to the address below. Official orders welcome.

28 day no quibble money-back guarantee.

Wordwise Plus II Prices (inc. VAT)

Upgrade from Wordwise Plus	£37.95
Upgrade from Wordwise	£47.15
WordWise Plus II complete	£56.35
Spell Master (£50 when purchased with WW+2)	£51.00
16K sideways RAM module	£16.00

Please allow £1 postage

Order with Access
on (0752) 847286
IFEL
36 Upland Drive
Derriford
Plymouth
PL6 6BD
(0752) 847286

MAIN PROCEDURES

name	Gets user's name
info1	Selects who chooses tables
choose	Chooses four tables
rnd	Sets up random numbers
tables	Does the four tables
times	Asks the questions
wrong	Tells you if you're wrong
type	Teletypes messages
save	Saves results screens
load	Loads results screens

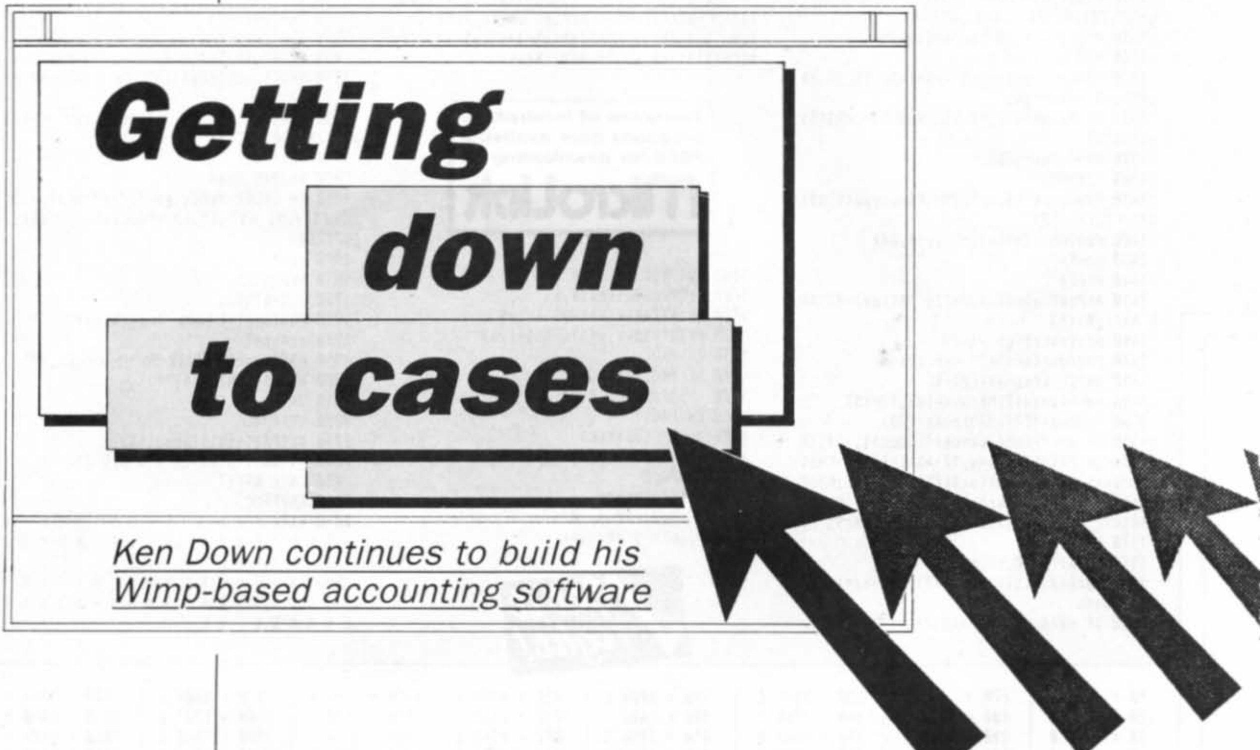
```
 1220 IF totok>27 AND totok<32 sk$="ACE"
 1230 IF totok<28 sk$="NOVICE"
 1240 PROCdbl(CHR$135+"speed  "+sp$,1,1)
:PROCdbl("skill  "+sk$,24,1)
 1250 PROCtype("Do you want to save the
scores (Y/N)?",1,20)
 1260 PROCyesno
 1270 IF g$="Y" PROCsave
 1280 PROCtype("Do you want to try some
more  (Y/N)?",2,20)
 1290 PROCyesno
 1300 IF g$="Y" sc=sc+1:CLS:GOTO200 ELSE
 CLS:PRINT"goodbye for now":END
 1310 ENDPROC
 1320 DEFPROCtimes(x,t$)
 1330 PROCclear(20)
 1340 PROCtype(CHR$131+"Press RETURN to
go",9,20):REPEAT UNTIL GET=13
 1350 PROCclear(20):secs=0:ok=0
 1360 FOR go=1 TO 9
 1370 t%=com%(go):right=t%*EVAL(LEFT$(t$
,1)):r$=STR$right
 1380 PRINTTAB(4+x,17-t%)CHR$136+CHR$135
+CHR$255
 1390 PROCclear(20)
 1400 TIME=0
 1410 PROCtype(t$,x+1,20):PROCtype(STR$t
%+" = ",x+5,20)
 1420 PROCdbl(CHR$255+" ",x+9,20)
 1430 ans$=""
 1440 REPEAT
 1450 REPEAT:g$=GET$:UNTIL ASC(g$)>47 AN
D ASC(g$)<58
 1460 ans$=ans$+g$
 1470 PROCdbl(ans$+" ",x+9,20)
 1480 UNTIL LENans$=LENr$
 1490 secs=secs+TIME:ans=EVAL(ans$)
 1500 PROCwait(2):PROCclear(20)
 1510 IF ans=right ok=ok+1:SOUND1,-12,16
0+t%*4,6:PRINTTAB(4+x,17-t%)CHR$137+CHR$
135+CHR$255:PROCdbl(ok$(t%),x+1,20):PROC
wait(3) ELSE PROCwrong:PROCwait(6):PRINT
TAB(4+x,17-t%)CHR$137+CHR$130+CHR$255
 1520 NEXT go
 1530 PRINTTAB(0,6)c$
 1540 seconds=INT(secs/100):totsec=totse
c+seconds
 1550 IF seconds<10 PRINTTAB(x+6,4)secon
ds ELSE PRINTTAB(x+5,4)seconds
 1560 PRINTTAB(x+5,18)CHR$135;ok
 1570 ENDPROC
 1580 DEFPROCrnd(total)
 1590 FOR N = 1 TO total+1:d%(N)=N:NEXT
 1600 REPEAT:X=RND(0):rnum=RND(total)
 1610 com%(total)=d%(rnum)
 1620 FOR N=rnum TO total-1:d%(N)=d%(N+1
):NEXT
 1630 total=total-1
 1640 UNTIL total=1:com%(1)=d%(1)
 1650 ENDPROC
 1660 DEFPROCtype(d$,x%,y%)
 1670 FOR j%=0 TO 1:PRINTTAB(0,y%+j%)CHR
$141:NEXT:*FX15,0
 1680 FOR k%=1 TO LENd$+1:SOUND0,-1,2,1:
FOR j%=0 TO 1:PRINTTAB(x%-1+k%-(k%=1),y%
+j%)"*":NEXT:TIME=0:REPEAT UNTIL TIME>4:
FOR j%=0 TO 1:PRINTTAB(x%-1+k%,y%+j%)MID
$(CHR$131+d$,k%,1):NEXT:NEXT
 1690 ENDPROC
 1700 DEFPROCdbl(m$,x,y)
 1710 PRINTTAB(x,y)CHR$141;m$
 1720 PRINTTAB(x,y+1)CHR$141;m$
 1730 ENDPROC
 1740 DEFPROCclear(y)
 1750  PROCdbl(c$,0,y)
 1760 ENDPROC
 1770 DEFPROCwait(d)
 1780 FOR time=1 TO d*1000:NEXT
 1790 ENDPROC
 1800 DEFPROCwrong
 1810 SOUND0,-10,2,10
 1820 right$=STR$right
 1830 PROCdbl(CHR$130+no$(t%),x,20)
 1840 PRINTTAB(x+1,6)CHR$130+t$+" "+STR$
(t%)+" = "+right$+"   "
 1850 ENDPROC
 1860 DEFPROCsave
 1870 PROCclear(20)
 1880 S%=&7C00:E%=&3C0:sc$=STR$(sc)
 1890 PROCtype(CHR$135+"file = "+name$+s
c$,2,20)
 1900 PROCoscli("SAVE "+name$+sc$+" "+ST
R$~S%+"+"+STR$~E%)
 1910 ENDPROC
 1920 DEFPROCload
 1930 ON ERROR PROCclear(20):PROCtype("I
 CAN'T FIND ANY",11,20):PROCwait(5):CLS:
GOTO200
 1940 sc=1
 1950 REPEAT
 1960 sc$=STR$sc
 1970 PROCoscli("LOAD "+name$+sc$)
 1980 sc=sc+1
 1990 PROCtype("RETURN to go on",22,20)
 2000 REPEAT UNTIL GET=13
 2010 UNTIL FALSE
 2020 ENDPROC
 2030 DEFPROCoscli($oscli%)
 2040 X%=oscli%:Y%=oscli% DIV 256
 2050 CALL &FFF7
 2060 ENDPROC
 2070 DATA R I G H T,G O O D !,* O K ! *
,F I N E !,G R E A T,N I C E !,B U E N O
,B E L L A,* G U T *
 2080 DATA O O O P S,T O U G H,N O P E !
,O U C H !,S O R R Y,* N O N *,N I E N !
,E R R O R,G O S H !
```

This is one of hundreds of programs now available FREE for downloading on MicroLink

Get it right!

```
  10 =    0 0 |  270 =  641 9 |  530 = DF7E 2 |  790 = BFBA C | 1050 = A989 A | 1310 = ED0F B | 1570 = ED0F 4 | 1830 = D3AA F
  20 =    0 0 |  280 = AE3A 2 |  540 = 136E 3 |  800 = 5A0D 4 | 1060 = 2A63 A | 1320 =  5A8 5 | 1580 = D22F 0 | 1840 = 6340 B
  30 =    0 0 |  290 = 5DDD B |  550 = F622 0 |  810 = 7854 3 | 1070 = D742 E | 1330 = 8CC7 1 | 1590 = CAEE 2 | 1850 = ED0F 2
  40 = 9631 1 |  300 = ED0F 9 |  560 = 1950 2 |  820 = D8DC 3 | 1080 = 1885 C | 1340 = D253 8 | 1600 = A9D6 8 | 1860 = 7A2C 8
  50 = 282A 5 |  310 =  5F6 A |  570 = C6ED 1 |  830 = 939F 1 | 1090 = FB48 9 | 1350 = 8ECD 0 | 1610 = 3D6F 3 | 1870 = 8CC7 6
  60 = 9C14 6 |  320 = 7A16 7 |  580 = 82E2 4 |  840 =  932 F | 1100 = B769 6 | 1360 = CCBF A | 1620 = 1354 E | 1880 = 7FD3 9
  70 = DC40 B |  330 = AA64 2 |  590 = A612 E |  850 =  CAA 8 | 1110 = 8CC7 B | 1370 = 7156 7 | 1630 = 8B30 6 | 1890 = 892A 5
  80 = E383 F |  340 = 2363 1 |  600 = 3CE7 4 |  860 = 7EA5 2 | 1120 = 7879 4 | 1380 =   92 3 | 1640 = CA82 8 | 1900 = 6C45 0
  90 = B046 8 |  350 = 5746 6 |  610 = 538E 7 |  870 = B414 2 | 1130 = BA6A 3 | 1390 = 8CC7 2 | 1650 = ED0F E | 1910 = ED0F 9
 100 = 2FD3 A |  360 = ED0F 7 |  620 = ED0F A |  880 = E372 2 | 1140 = 9F04 A | 1400 = 173E 1 | 1660 = 71EE 1 | 1920 = 24A1 5
 110 = 4FBB 2 |  370 = 8784 1 |  630 = B08A 7 |  890 = ED0F 1 | 1150 = DAB3 3 | 1410 = 5793 8 | 1670 = C8F8 C | 1930 = 5B92 2
 120 = C9AE 6 |  380 = D3C7 1 |  640 = 2EE6 5 |  900 = D5C1 B | 1160 = 3D18 4 | 1420 = 135C F | 1680 = 2B31 5 | 1940 = 4E29 B
 130 = 759B 5 |  390 = ED0F 7 |  650 = F6AF 5 |  910 = 44E6 3 | 1170 =   37 D | 1430 = 397B A | 1690 = ED0F 6 | 1950 = BFBA 0
 140 = 15F2 2 |  400 = 32BB 6 |  660 = 518B E |  920 = ED0F 6 | 1180 = AEE3 B | 1440 = BFBA 0 | 1700 = 42E4 1 | 1960 = 27AE 2
 150 = 40B1 1 |  410 = D9BD D |  670 = 9CCF 9 |  930 = 3FD1 F | 1190 = 410D 6 | 1450 = 5CE9 6 | 1710 = 2B06 2 | 1970 = D806 0
 160 = 1D4B 5 |  420 = A911 4 |  680 = B414 C |  940 = 7A16 9 | 1200 = 70DF 7 | 1460 = 12E2 A | 1720 = E49B D | 1980 =  773 A
 170 = 4E29 7 |  430 = 3A70 7 |  690 = ED0F 0 |  950 = AA64 5 | 1210 = D819 3 | 1470 = 8E23 1 | 1730 = ED0F 8 | 1990 = B187 3
 180 = 6DDF D |  440 = 8902 3 |  700 = FE9C 3 |  960 = 6365 B | 1220 = C347 1 | 1480 = 87AF 4 | 1740 = D455 D | 2000 = 5DDD 3
 190 = 6D73 A |  450 = FD12 F |  710 = 136E 2 |  970 = 240F E | 1230 = C947 9 | 1490 = 28A0 7 | 1750 = 2963 6 | 2010 = 226C 4
 200 = 4479 6 |  460 = 1E9B 9 |  720 =  A6F E |  980 = 6DD8 D | 1240 = 82C1 E | 1500 = 260D C | 1760 = ED0F 8 | 2020 = ED0F 6
 210 = 741A 2 |  470 = 8D9E E |  730 = 6365 6 |  990 = 1F58 8 | 1250 = FAFD 5 | 1510 = 89A2 5 | 1770 = CCF6 8 | 2030 = D80D B
 220 = 5F50 0 |  480 = EF1D 1 |  740 = 3554 E | 1000 = 8FF4 9 | 1260 = 7EA5 5 | 1520 = 345E 6 | 1780 = 39F9 5 | 2040 = B9E3 B
 230 = 8728 7 |  490 = 136E 0 |  750 = CF00 F | 1010 = 894B 6 | 1270 = 8166 D | 1530 = D742 0 | 1790 = ED0F 3 | 2050 = 17A4 2
 240 = 136E 4 |  500 = 4C0E 4 |  760 = A592 9 | 1020 = 123B 9 | 1280 = 7CC2 1 | 1540 = 5D5D 5 | 1800 = E7E9 B | 2060 = ED0F 1
 250 = 6833 A |  510 = BA3C B |  770 = 3A89 F | 1030 = 7B39 6 | 1290 = 7EA5 4 | 1550 = C484 D | 1810 = 2450 9 | 2070 = 6DA6 1
 260 = 2C3F 7 |  520 = ED0F D |  780 = 5317 8 | 1040 = 4E07 E | 1300 = 8BAA A | 1560 = C579 E | 1820 = 5714 4 | 2080 = DD62 0
```

Getting down to cases



Ken Down continues to build his Wimp-based accounting software

THE data structure of the accounts program we've been putting together over the past few months owes its form to the memory limitations of the original BBC Micro, on which a non-Wimp version was first written. For example, the account names are held in the array *ac$()* and the problem is to determine the area to which the account relates.

The easiest solution is to have a two dimensional array – *ac$(,)* – with the second dimension linked in some way to the area name or number. But multi-dimension arrays use a lot of memory. An alternative is to have two arrays, one for the account name and one for the area number or name, but this again uses a lot of memory. An accounts program really needs an 80 column mode so both alternatives were out with a BBC Micro lacking shadow memory.

The solution adopted was to include the area number as part of the account name string and we covered the line which effects this last month:

```
10230 IFicon%=3:ac$(N%)=CHR$ac%+$filename%:N%
+=1:IFN%=2i%=INSTR(menu$,"*New Entry"):MID$(m
enu$,i%,1)=".":i%=INSTR(menu$,"*Save"):MID$(m
enu$,i%,1)=".":j%=FNcreatemenu(menublock%,men
u$,textblock%)
```

Notice *ac$(N%)=CHR$ac%+$filename%* where the first byte of the string is the area number. This can lead to some strange results if you try to print *ac$()* – the most common one being the screen hanging up because the printer has been enabled. The details of each transaction or entry are held in *r$(i%)*. As you will see in this month's programming, we use a similar method to construct the array elements:

```
10600 |R%=VALMID$($(mtext%+24),2):r$(L%)=CHR$
from%+CHR$fac%+CHR$cr%
10610 FORi%=0TO4:r$(L%)+=CHR$(R%?i%):NEXT:r$(
L%)+=$filename%+$mtext%
```

Line 10600 uses the Archimedes' new indirection operator – *|* – to place a real number in memory location *R%*. BBC Micro users are familiar with the indirection operators *?* and *!* which store one and four bytes in memory respectively. The new one assigns a real number to five bytes.

These are read by the FOR ... NEXT loop in line 10610 and made part of the string *r$()*. The first two bytes give the area and account numbers, the third holds a credit or debit indicator. The next five bytes are the amount, and this is followed by the date and the transaction details.

It follows that the first 17 bytes of each element of *r$()* are in a fixed format. Rather than having a number of separate arrays to hold the number, date, account and area details we use string slicing operations to divide it up. It is very memory efficient but rather confusing if you are trying to work out what's going on.

The basis of double entry book keeping is that every transaction must have a corresponding entry on the other side of the book. That is to say, every credit entry must have a debit, and vice versa.

To take a simple illustration: I have an account called *Gas*. When the postman brings the bill for – shall we say £130 – I have to pay it, which means I credit Gas with £130. In other words, the bill created a debt in the account Gas which I settled by putting money into that account.

However, that money had to come from somewhere. In the unlikely event that it came from thin air that would be the end of the matter, but in fact it comes from my hard-earned life savings. So I must debit my bank account by the sum of £130.

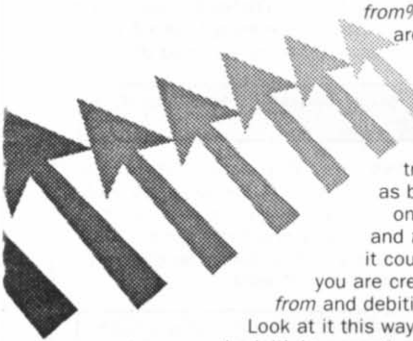
This may seem a cumbersome procedure in the age of the micro when trial balances can be completed at the press of a key. Nevertheless, that's the way accountants have always worked, and who's to say they are wrong?

Right, let's make a start with this month's addition to the program. First of all a new line for the menu decoding routine:

```
1630 WHEN1:PROCenter
```

Now the code for PROCenter itself. This first sets the text input blocks to certain default values – the current date in memory block *filename%*, a null string in *mtext%* and the pound sign in *mtext%+24*.

```
10300 DEFPROCenter
10310 $filename%=MID$(TIME$,5,11):$mtext%="":$(
mtext%+24)="£"
10320 from%=&FF:fac%=&FF:to%=&FF:tac%=&FF:cr%=3
:fz%=29:tz%=50
10330 RESTORE20100:dialog%=FNcreatedialog(7)
10340 PROCsetcaret(dialog%,19,0,0,-1,0):ENDPROC
```



The second line sets certain variables as flags: *from%* and *to%* are the area numbers. Although I tend to think of each transaction as being *from* one account and *to* another it could be that you are crediting the *from* and debiting the *to*. Look at it this way – *from* is the initial transaction, *to* is the corresponding entry in the double-entry system. You are taking an entry from one book and putting its details into another book rather than transferring money.

The accounts within each area are *fac%* and *tac%* – *From ACcount* and *To ACcount*. All these variables are set to &FF to signal to the program that you have not yet made a selection from the areas and accounts offered to you by the program.

The flag *cr%* is short for credit and specifies whether a transaction is a credit or debit entry. Obviously if it is a credit entry this variable is changed to a debit for the corresponding entry and vice versa. I'll explain the variables *fz%* and *tz%* later.

PROCenter calls FNcreatedialog to make a dialogue box with the background colour of white and sets the caret to be in icon number 19 within that box.

Let's just look briefly at the structure of the DATA for FNcreatedialog. The first line gives the name, size of the box and the number of icons within it.

```
20100 DATAentry,15,1280,900
```

Lines 20110 and 20120 make two icons and call FNnewarea to list the account areas within them. Each area is itself an icon within the larger icon. Note that the first is set to a background colour of red to draw attention to it. Notice also that if you have more than seven areas you will have to make quite a few changes in this part of the program.

```
20110 DATA280,40,490,340,1,0,&303D,"FNnewarea(
&3039,0)"
20120 DATA790,40,1000,340,7,0,&303D,"FNnewarea
(&3039,0)"
```

The next six lines set up the data entry icons. The first icon in each pair contains a string indicating what information is required – the date, the amount or the transaction details. These icons are coloured green.

The second icon is writeable, as indicated by the flag &F115. Instead of a string the lines contain the address of the input buffer and the length of string that the program will accept.

```
20130 DATA280,830,420,870,2,0,&303D,Date
20140 DATA440,830,1000,870,7,0,&F115,"filename
%,20"
20150 DATA280,730,420,770,2,0,&303D,Details
20160 DATA440,730,1000,770,7,0,&F115,"mtext%,2
0"
20170 DATA280,630,420,670,2,0,&303D,Amount
20180 DATA440,630,1000,670,7,0,&F115,"mtext%+2
4,20"
```

The following four lines create buttons on which the user can click, indicating whether the first part of the transaction is credit or debit, confirming that the entry is OK, or cancelling the entry procedure.

```
20190 DATA400,530,540,570,7,0,&303D,Credit
20200 DATA740,530,880,570,7,0,&303D,Debit
20210 DATA390,430,540,470,3,0,&303D,OK
20220 DATA740,430,890,470,7,0,&303D,Cancel
```

The next two lines create two large blank icons either side of the dialogue box. When you select the area they will each contain a further 20 icons, listing the accounts within the chosen area:

```
20230 DATA40,18,250,882,7,0,&303D,""
20240 DATA1030,18,1240,882,7,0,&303D,""
```

The final DATA line sets up an information icon, telling users that the details on the left represent the *from* and those on the right represent *to*. The left and right arrows can be entered with Shift+f8 and Shift+f9.

```
20250 DATA510,170,770,210,4,7,&303D,"[ From.To]"
```

Wimp programming is not a straight through process. Having made our selection from the menu, the program simply draws the dialogue box on the screen and then goes back to the main loop with FNpoll to see what we are going to do next.

Hopefully we are going to carry on with the data entry, but it would be possible to call up some other part of the program unless this is specifi-

Turn to Page 84 ▶

> *You are taking an entry from one book and putting its details into another book rather than moving money*

◀ From Page 83

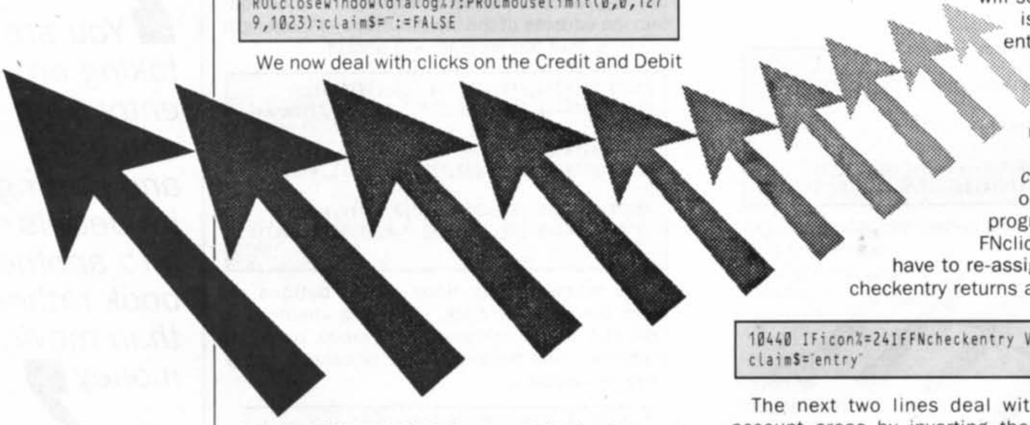
cally disabled by the software. We therefore need a separate routine to handle any clicks within the area of the dialogue window. This is FNclickdialogentry.

Notice that we have used the same syntax as before when we were entering a new account name – *FNclickdialog* plus an identifying name, the one given as the first data item when creating the dialogue box. This means that having more than one dialogue box open at a time will cause problems because the variable *claim$* has been re-assigned.

The first line deals with clicks on the Cancel button, which in this window is icon number 25. We close the dialogue box, reset the mouse rectangle to the whole screen size, make *claim$* a null string and return a value of FALSE.

```
10400 DEFFNclickdialogentry(icon%):IFicon%=25P
ROCclosewindow(dialog%):PROCmouselimit(0,0,127
9,1023):claim$="":=FALSE
```

We now deal with clicks on the Credit and Debit buttons. Although both have a white background to begin with, clicking on Credit turns it blue and resets the other to white, while clicking Debit turns it red and the other back to white.



```
10410 IFicon%=22cr%=1:PROCseticon(dialog%,22,6)
:PROCseticon(dialog%,23,7)ELSEIFicon%=23cr%=0:P
ROCseticon(dialog%,23,1):PROCseticon(dialog%,22
,7)
```

A click in the left-hand area box selects an area and sets the variable *from%* so that it is impossible to reselect from this box. The various accounts in the selected area are displayed in the left-hand box by FNnewacc but do not appear unless you call PROCseticon. Once you have made the selection the box surrounding the areas is cleared to white.

```
10420 IFicon%>0IFicon%<8IFfrom%=&FFPROCinverti
con(dialog%,icon%):from%=icon%-1:h%=dialog%:bx
%=40:tx%=250:ty%=868:fz%+=FNnewacc(from%,&3039
):PROCseticon(dialog%,26,7):PROCseticon(dialog
%,0,7)
```

The next line does exactly the same thing for the right-hand box, allowing you to select an area and then displaying the accounts in that area. Notice that nothing happens if you click in this area until you have selected *From*.

The reason for this is that you cannot decide in advance the numbering of the icons. If we allowed the user to select *to* first then icons 29 to 48 would be created on the right-hand side, which would cause problems when we tried to decode the accounts in line 10460:

```
10430 IFicon%>8IFicon%<16IFto%=&FFIFfrom%<&FFP
ROCinverticon(dialog%,icon%):to%=icon%-9:h%=di
alog%:bx%=1030:tx%=1240:ty%=868:tz%+=FNnewacc(
to%,&3039):PROCseticon(dialog%,27,7)
```

An alternative approach would be to use *to%* and *from%* to set a variable to point at the correct set of icons. It might take the form of a line such as:

```
IFto%=&FFIFfrom%<&FFt%=29:f%=48ELSEIFfrom%=&FF
IFto%<&FFt%=48:f%=29
```

This is just a suggestion, and is not part of the program. The next program line deals with clicks on the OK button by calling FNcheckentry. As you will see, if something is wrong with the entry FNcheckentry creates another dialogue box with a warning message. Doing this re-assigns *claim$* so that in order to keep the program returning to FNclickdialogentry we have to re-assign *claim$* if FNcheckentry returns a value of FALSE

```
10440 IFicon%=24IFFNcheckentry VDU7:=TRUE ELSE
claim$="entry"
```

The next two lines deal with icons in the account areas by inverting the selected icon. There is no checking carried out here, so it is possible to select and reselect accounts. The variables *tz%* and *fz%* prevent selection of accounts which do not yet exist.

```
10450 IFicon%>28PROCinverticon(dialog%,icon%)
10460 IFicon%>49IFicon%<tz%tac%=icon%-50ELSEIF
icon%>28IFicon%<fz%fac%=icon%-29
```

If all else fails, as a safety measure the function returns FALSE.

```
10470 =FALSE
```

FNnewarea is a simple function that produces seven rectangular icons containing the names of the seven areas. *type%* is the icon type and *esg%* refers to the exclusive selection group. Although we make no use of the ESG feature in this part of the program, it is included in this shell program for your future use:

```
10800 DEFFNnewar,g%):ALi%:t%=ty%0
8FORi%0eateicon(h%
tx%-4,7ty%,esg%,a$(i%)):t%-=40:NEXT
10820 =TRUE
```

The checkentry function contains two main sec-

Turn to Page 87 ▶

BBC Acorn User Show

BBC ACORN USER, with the backing of the BBC and the enthusiastic support of Acorn Computers, have together planned what could be the most exciting computing event of the year.

The new, all-action BBC ACORN USER SHOW is back, at the first home of BBC TV – Alexandra Palace featuring:-

- new product launches
- new software
- informative seminars
- technical clinics
- workshops
- demonstrations
- massive computing exhibition

All this and more will make the new BBC ACORN USER SHOW a real must for everyone interested in computers and their applications.

There are daily competitions, free draws with fabulous prizes to be won and celebrity guest appearances.

NORTH CIRCULAR ROAD
ALEXANDRA PALACE
To M25

THE 1989 BBC ACORN USER show

ALEXANDRA PALACE · LONDON
Friday July 21st 3pm-9pm
Saturday July 22nd 10am-6pm
Sunday July 23rd 10am-6pm

Facilities at the tastefully restored Alexandra Palace are simply superb and it's so easy to get to by road, rail or tube. If you're driving you'll be glad to know there are 2000 free car parking spaces. So why not make a day of it? Apart from the beautiful grounds you'll find something interesting and exciting around every corner.

Why not save time and money by booking your ticket in advance? Cut the coupon now and ensure your priority booking.

BOOK NOW AND SAVE

Advance Tickets: Adults £2.50 Under 16s £1.50 **At the door:** Adults £3.50 Under 16s £2.50

Please send me ________ Adult Tickets at £2.50 each

Please send me ________ Under 16s Tickets at £1.50 each.

I enclose cheque/PO for £________ payable to SAFESELL Ltd., Market House, Cross Road, Tadworth, Surrey KT20 5SR. **DON'T SEND CASH.**

Name ________

Address ________

MC 1

Order your copy today using the form below

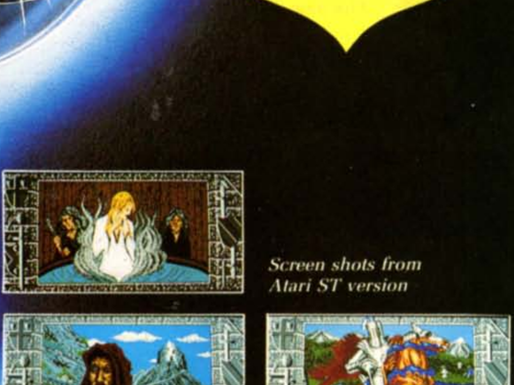
Travel back to the Age of Chivalry when knights were bold, galloping across the countryside and rescuing damsels in distress.

Level 9 recreate the time of wizards and the Knights of the Round Table in their greatest adventure yet. Lancelot consists of three interlinked adventures, spanning the complete saga from the foundation of the Order to its finest hour – the quest for the Holy Grail.

Guide Lancelot through his many exploits at Camelot, battle with wayward knights, and win the love of Guinever and Elaine.

The challenge which has fascinated treasure hunters through the centuries is now yours – and you'll need all your strength, wit and valour to achieve your goal.

Inside every box there's a detailed guide to playing Level 9 adventures, a background story to the classic legend, a parchment map of Arthurian England – and full details of how to take part in the Quest for the Holy Grail competition.



Screen shots from Atari ST version

MANDARIN SOFTWARE

Level 9

Please send me the following Lancelot (tick the format you require):

£14.95	Tape	Disc
Atari XL/XE	7063 *	7065 *
Amstrad CPC	6171 *	
Apple II		1052 *
BBC Master		2192
Commodore 64	9003 *	9004
MSX 64k	9093 *	
Spectrum	9091 *	

** Text only*

£19.95	Disc
Atari ST	9155
Commodore Amiga	9522
Amstrad CPC/PCW/ Spectrum Plus 3	6172
IBM PC and Compatibles	5724
Macintosh	1053

Tape versions come with three cassettes in every package

Dealers: Ring Diane O'Brien on 0625 878888 for your free Mandarin Software information pack

MANDARIN SOFTWARE

☐ I enclose a cheque for £............(including VAT and p&p) made payable to Mandarin Software

☐ Please debit my Access/Visa card no:

☐☐☐☐ ☐☐☐☐ ☐☐☐☐ ☐☐☐☐

Expiry date: ☐ / ☐

Signature: ....

Name: ....

Address: ....

.... Postcode ....

SEND TO:

Database Direct, Freepost, Ellesmere Port, South Wirral L65 3EB. Tel: 051-357 2961

AMC5

◀ **From Page 84**

tions: The first creates a dialogue box warning that part of the input has been omitted. For example, the first line checks that there is a date, and if not it produces the message *There is no date!*:

```
10500 DEFFNcheckentry:IF$filename%=""PROCcreat
ealert("There is no date!"):=FALSE
1510 IF$mtext%="0Ccrealert("There  no details!
")ALSE
10 IF$(mtex)="£"PRatealert("How much?"):=FALSE
10530 IFfrom%=&FFPROCcreatealert("From which a
rea?"):=FALSE
10540 IFfac%=&FFPROCcreatealert("From which ac
count?"):=FALSE
10550 IFto%=&FFPROCcreatealert("To which area?
"):=FALSE
10560 IFtac%=&FFPROCcreatealert("To which acco
unt?"):=FALSE
10570 IFcr%=3PROCcreatealert("Credit or Debit?
"):=FALSE
```

Once all the checks have been made the second section of the function creates the data entry. As there is no easy method of reading the text in an icon, lines 10580 and 10590 work out what the name of the *from* account is.

```
10580 tl%=0:i%=0:WHILEi%<=N%:IFASC(LEFT$(ac$(i
%),1))=from%list%?tl%=i%:tl%+=1
10590 i%+=1:ENDWHILE:name$=MID$(ac$(fac%?list%
),2)
```

Line 10600 uses the | operator to place the money value of the entry in memory block *R%* and then starts constructing the data string *r$()*. Line 10610 reads the money value from *R%* and adds it to the data string as a series of CHR$ values. The data string is completed by adding the date and details strings.

The process is then repeated to make an entry for the corresponding account, which is constructed in exactly the same way. Obviously the variable *cr%* is reversed to indicate the opposite sign to the initial entry.

Instead of the details that were typed in, the program adds the word *From:* and the name of the account the entry was taken from. As it is possible to give accounts in different areas the same name this is perhaps not the best solution. I'll leave it up to you to add the area name – or number – as well if you want to:

```
10610 |R%=VALMID$($(mtext%+24),2):r$(L%)=CHR$f
rom%+CHR$fac%+CHR$cr%
10620 FORi%=0TO4:r$(L%)+=CHR$(R%?i%):NEXT:r$(L
%)+=$filename%+$mtext%
10630 |R%=VALMID$($(mtext%+24),2):r$(L%+1)=CHR
$to%+CHR$tac%+CHR$(ABS(1*(cr%=0)))
10640 FORi%=0TO4:r$(L%+1)+=CHR$(R%?i%):NEXT:r$
(L%+1)+=$filename%+"From: "+name$
```

The variable *L%*, which holds the total number of entries, is increased by two. If, however, *L%* is equal to two – this is the first entry in the program – various options on the menu that have hitherto been disabled need to be enabled:

```
10660 L%+=2:IFL%=2THEN
10670 i%=INSTR(menu$,"@Edit"):MID$(menu$,i%,1)
=".
10680 i%=INSTR(menu$,"@Delete"):MID$(menu$,i%,
1)=".
10690 i%=INSTR(menu$,"@Display"):MID$(menu$,i%
,1)=".
10700 i%=INSTR(menu$,"@:Balance"):MID$(menu$,i
%,1)=".
10710 j%=FNcreatemenu(menublock%,menu$,textblo
ck%)
10720 ENDIF
10730 =TRUE
```

The alert box with its warning message is created by PROCcreatealert. The warning message is held in memory block *alertm%* which has been set to hold 80 characters. If you want more than this you will have to extend it, but you might run into formatting problems.

In addition *len%* is included in the DATA and must be set before it can be EVALuated. We want to distinguish this dialogue box from others that may be on the screen, so we set its background colour to 6 – cyan:

```
3000 DEFPROCcreatealert(m$)
3010 oldmbx%=mbx%:oldmby%=mby%:oldmtx%=mtx%:o
ldmty%=mty%
3020 $alertm%=m$:len%=LENm$:RESTORE20300:aler
t%=FNcreatedialog(6):ENDPROC
```

The data for the alert box follows. Notice that line 20320 calls for a sprite. Unless you have loaded the sprite file called MoneyIcons nothing will appear at the left of the box. However it is only necessary to *SLOAD MoneyIcons once each session which should save wear and tear on your disc drive while debugging.

```
20300 DATAalert,3,"200+FNgreater(16*LENm$,200)
",200
20310 DATA190,30,350,70,15,0,&303D,Continue
20320 DATA40,55,1,1,6,0,2,stop
20330 DATA180,100,180+16*len%,140,6,0,&119,"al
ertm%,len%"
```

● *Next month we will see how to save and load the data that has been so painfully typed in. We will also construct our very first* real *window.*

ALL OUR PRICES INCLUDE CARRIAGE & VAT

HSV COMPUTER SERVICES LIMITED (MU)

23, Hampstead House, Town Centre, Basingstoke, RG21 1LG.

DISKS UNBRANDED LIFETIME GUARANTEE

	Quantity	10	20	30	40	50	100
3½" DS/DD	135 TPI	8.95	17.50	25.50	32.25	40.50	79.95

ALL 3½" DISKS COME COMPLETE WITH LABELS

	Quantity	25	50	75	100	200
5¼" DS/DD	48 TPI	8.95	16.50	23.25	29.95	57.95
" DS/QD	96 TPI	9.50	17.95	25.50	32.95	63.95

ALL 5¼" DISKS SUPPLIED WITH WRITE PROTECT TABS, LABELS AND ENVELOPES WITH OUR NO QUIBBLE MONEY BACK OR REPLACEMENT GUARANTEE

BRANDED DISKS PER BOX OF 10

Platinum	5¼" DS/DD	48 TPI	£5.95	Verbatim	5¼" DS/DD	48 TPI	£9.95
	5¼" DS/QD	96 TPI	£7.95		5¼" DS/QD	96 TPI	£16.95
	3½" DS/DD	135 TPI	£12.95		3½" DS/DD	135 TPI	£16.95
3M	5¼" DS/DD	48 TPI	£9.95	Sony	3½" DS/DD	135 TPI	£16.95
	5¼" DS/QD	96 TPI	£16.95	Dysan	5¼" DS/DD	48 TPI	£12.95
	3½" DS/DD	135 TPI	£16.95		5¼" DS/QD	96 TPI	£18.95
					3½" DS/DD	135 TPI	£18.95

DISKETTE STORAGE BOXES

	Price Each
70 x 5¼" HINGED LID LOCKABLE	£5.95
110 x 5¼" HINGED LID LOCKABLE	£7.95
140 x 5¼" HINGED LID LOCKABLE	£9.95
50 x 3½" HINGED LID LOCKABLE	£5.95
100 x 3½" HINGED LID LOCKABLE	£7.95

BOXES WITH DISKS

50 x 5¼' DISKS + 110 CAP.BOX	DS/DD	£22.50
	DS/QD	£23.95
100 x 5¼' DISKS + 140 CAP.BOX	DS/DD	£37.95
	DS/QD	£40.95
20 x 3½" DISKS + 50 CAP.BOX	DS/DD	£21.50
50 x 3½" DISKS + 100 CAP.BOX	DS/DD	£46.50

[ORDERS UNDER £8 CARRY A SMALL ORDER CHARGE OF £2]

Credit Card Hotline (0256) 463507 Faxline (0256) 841018

PINEAPPLE SOFTWARE

PCB DESIGNER

PCB is a powerful Rom based printed circuit board design program suitable for all BBC computers. Its fast high density 1:1 scale print routine allows prototype boards to be made directly from a printout, and a 2:1 scale print may also be used to produce professional quality boards. A second eprom is optionally available to add a powerful auto-track routing facility to the program. This utilises a 'rats-nest' input routine and allows any component to be 'picked up' and moved around the board without having to respecify component interconnections. The full auto-route facilities are available even on a standard unexpanded model 'B'.

'PCB auto-route is remarkable. No similar software comes near the price.' –ACORN USER, Aug. '88.

'Although it appears expensive, there is nothing else remotely similar, even on other micros for less.' –BEEBUG, April '88.

PCB Manual Track Routing	£85.00
PCB Auto-routing	£185.00
PCB Plotter Driver	£35.00

P&P Free

IBM PCB DESIGNERS

EASY-PC EASY-PC is a powerful PCB design program combined with a schematic drawing package. Up to 8 board layers plus upper and lower silk screens. Board size up to 17"x17". Powerful zoom and pan features. Suitable for IBM PC/XT/AT & compatibles with 512k Ram.

EASY-PC £270.00

P&P Free

PCB TURBO V2 Unbeatable full feature auto-routing IBM PCB designer. Boards up to 32" x 32" with 6 layers. Output to pen plotter, photoplotter, dot-matrix printer or laser printer. Minimum requirements: IBM XT/AT compatible (286 or 386 processor) with 640k Ram and 10mb hard disc. CGA, EGA or VGA colour graphics adapter.

PCB TURBO V2 .... £695.00

P&P Free

ROLAND PLOTTERS

New 1000 series plotters at unbeatable prices! All with A3 paper handling 8 pens and 420mm/sec plotting speed. Parallel and serial interfaces and soft pen landing with automatic origin setting on all models. 1200 model has addition of electrostatic paper hold and X-Y coordinate display. 1300 model also has manual pen speed adjustment and a 1Mb buffer.

DXY 880A	£540.00
DXY 1100	£625.00
DXY 1200	£865.00
DXY 1300	£1025.00

P&P £10.00

Please add 15% VAT to all prices

HOME ACCOUNTS

A brand new program from Pineapple offering the simplest solution to keeping track of all your home accounts. The program is unbelievably simple to use but still offers all the essential features such as automatic standing order handling, statement reconciliation etc. Any number of accounts may be stored on disc and transfers between accounts requires only a single operation. Available for Model 'B', Master and Compact with disc drive.

Home Accounts .... £19.95 P&P Free

DIAGRAM II

Still the only BBC drawing package to allow really large diagrams (up to 30 mode 0 screens DFS, 80 mode 0 screens ADFS) to be created. The unique scrolling and indexing system allows easy access to any part of the diagram, and the rapid line drawing routines enable diagrams to be produced very rapidly. The print routines provide unequalled flexibility with infinitely variable H & V scales and 90 deg. rotation if required. The smallest scale allows up to 18 mode 0 screens to be printed on an A4 sheet with clearly readable text, and full use can be made of wide carriage printers.

'The quality of printing is the last factor which makes Diagram II so outstanding. The package really is capable of producing top quality diagrams.' –ETI, March '88

Diagram II .... £55.00 P&P Free

ADFS Utilities Rom

ADU is an invaluable utility for all ADFS users. It adds over 22 new *commands to the ADFS filing system as well as providing an extensive Menu facility with over 35 sub commands covering areas such as repeated disc compaction, saving and loading Rom images, auto booting of files and many more. Transferring of files from DFS to ADFS is also made very easy with *DFSADFS.

ADU .... £29.00 P&P Free

MARCONI TRACKERBALLS

We now have an adapter available to link the trackerball to the Archimedes, to enable it to directly replace the Archimedes mouse.

Bare Trackerball (no software)	£45.00	For Model 'B' and 'B+' (with Icon Artmaster)	£59.00
For Master 128 (with Pointer Rom)	£59.00	Pointer Rom for Master 128	£12.50
Adapters to drive BBC Mouse software	£8.00	Archimedes Adapter	£19.95

Trackerballs also available for other computers, please 'phone for details P&P on Trackerballs £1.75

MITEYSPICE, SPICE.AGE and ECA-2

Three very powerful circuit analysis packages. Miteyspice is available for the BBC range of computers, and Spice.Age and ECA-2 for the IBM and compatibles. Spice.Age is a new product for the IBM range which provides facilities for transient and Fourier analysis as well as D.C. and Freq. response performance.

Miteyspice (for BBC and Archimedes)	£119.00	Spice.Age (IBM PC/XT/AT 512k Ram)	from £70.00
ECA-2 (IBM PC/XT/AT 256k Ram)	£675.00	LCA-1 (Logic Analyser for IBM's)	£350.00

P&P Free

Please address all enquiries to:
PINEAPPLE SOFTWARE
Dept. MU, 39 Brownlee Gardens, Seven Kings, Ilford, Essex IG3 9NL. Tel: 01-599 1476

Five Alive!

Mike Goldberg presents a great type-in game with surprises in store

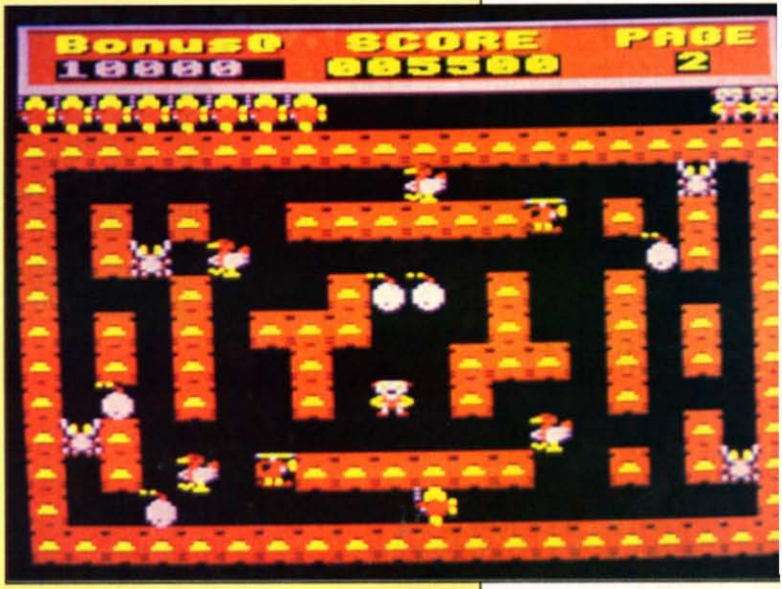
HERE's a game that's great fun to play – and has no plot at all. On each of the eight levels there is a maze with its own individual sprites. Move around collecting the treasures and avoiding the baddies until you are transported to the next level. You start with six lives and get a new one at each bonus score – which is displayed as you go.

Every now and then two mystery blocks appear with surprising effects, but we won't tell you what they are. The controls are simple – just use Z, X, : and /.

The method of moving the sprites is quite interesting. A data file is created with Listing I which contains all the sprite codes. These are drawn on to the screen using Basic's indirection operator – ! – which turns out to be quite fast. You can achieve smooth, half-character motion by offsetting the position of each object by eight .

Enter Listing I and ensure it is correct with Get it Right! When run it generates a file called DATA which is loaded by Listing III. If you are using tape make sure you don't overwrite other files.

Type in Listings II and III saving them as 5ALIVE1 and 5ALIVE2. Make sure you've made no typing errors using the checksums then CHAIN"5ALIVE1" for some great entertainment.



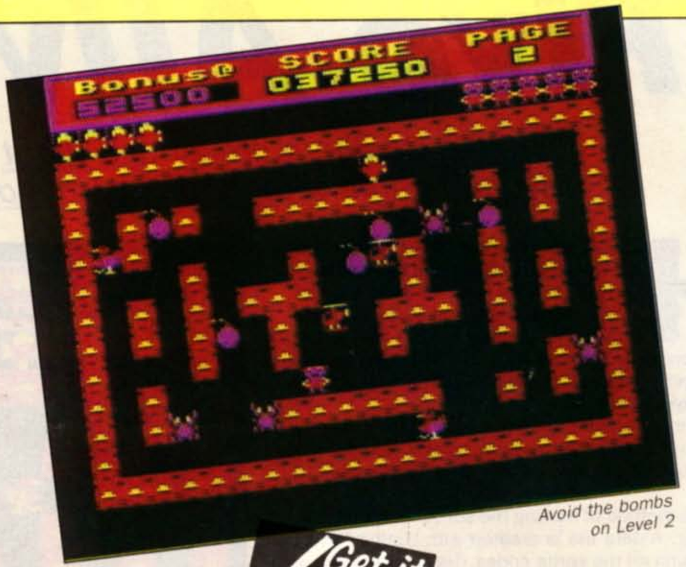
Grab the ducks on Level 2

```
10 REM 5 Alive Data Maker
20 REM by Mike Goldberg
30 REM (c) The Micro User
40 MODE7:H%=&4F00:HIMEM=H%
50 PRINTCHR$136CHR$129"Creating...";
60 REPEAT READ a$
70 IF a$>" !H%=EVALa$:H%=H%+4
80 UNTIL a$=":PRINT
90 *SAVE XDATA 4F00+900
100 END
110 DATA&8988886B,&80800A8A,&1911116B
120 DATA&18140515,&88098181,&6B888889
130 DATA&11011010,&6B111111,&280819CA
140 DATA&90A82828,&41018935,&90514141
150 DATA&28A89090,&CA190828,&41519090
160 DATA&35890141,0,0,0,0,0,0,0,0,0
170 DATA0,0,0,0,0,0,0,0,0,0,0,0,0,0
180 DATA0,0,0,0,0,0,0,0,0,0,0,0,0,0
190 DATA0,0,0,0,0,0,0,0,&33331355
200 DATA&B88B4720,&CCCC8CAA,&D11D2E40
210 DATA&8BB84703,&899A7403,&1DD12E0C
220 DATA&1995E20C,&F250701,&9090B0F
230 DATA&F0E0E08,&9090D0F,&5030E0F
240 DATA&EF8E9E05,&A0C070F,&7F17970A
250 DATA&BBEFFF77,&9F9F9F9D,&1FA6C480
260 DATA&FF5555FF,&9F9F9F9F,&77DF9F9F
270 DATA&55FF5555,&FFF5FF55,&50F050B0
280 DATA&1111B060,&A0F0A0D0,&CC00D060
290 DATA&7070022,&3030300,&E0E88AA
300 DATA&C0C0C00,&AAAAA050,&E4026AA
310 DATA&3023311,&D0F0E161,&3071612
320 DATA&103,&E0F0B0D0,&F00,&447700FF
330 DATA&CC555544,&22EE00FF,&BBAAAA22
340 DATA&445555DD,&FF007744,&22AAAA33
350 DATA&FF00EE22,0,0,0,0,0,0,0,0
360 DATA&77557D37,&53132266,&EEAAEBCE
370 DATA&AC8C4466,&3638787,&62222
380 DATA&C6C1E1E,&64444,&A88A8888
390 DATA&33456464,&51151111,&CC2A6262
400 DATA&3337BB19,&AAA9937,&CCCEDD89
410 DATA&55599CE,&1A0,&77333311
420 DATA&8080000,&EECCCC08,&77777777
430 DATA&11332277,&EEEEEEEE,&88CCCCEE
440 DATA&71111F8,&B090909,&180000F1
450 DATA&4C5C1E1E,&20070F0F,&728
460 DATA&80000808,&E82,&3C30603
470 DATA&57030301,&9080800,&FFEF0303
480 DATA&13579F9F,&1040A001,&CCEEFFEE
490 DATA&C0808080,&30B81098,&F0503A9
500 DATA&C0C08080,&F1E1C48,&3034707
510 DATA&101001,&C1C1E0F,&80808008
520 DATA&7070F0F,&1E0E0F0F,&E0E0F0F
530 DATA&87070F0F,&F0C3C1E,&E070F07
540 DATA&F03C387,&70E0F0E,0,0,0,0,0,0
550 DATA0,0,&FFB99937,&E7F2244
560 DATA&FFD999CE,&7EF4422,&38B3A0B
570 DATA&E0E00606,&C1DC50D,&70700606
580 DATA&270B0250,&4000C03,&4E0D04A0
590 DATA&200030C,&347000B,&110103
600 DATA&C2E000D,&88080C,&F0F0F034
610 DATA&10170F0,&D0B2F4C2,&808E0F0
620 DATA&33222211,&30101011,&CC444488
630 DATA&C0808088,&25340703,&7073425
640 DATA&4AC20E0C,&4E4EC24A,&25253407
650 DATA&7073425,&4A4AC20E,&E0EC24A
660 DATA&75777744,&33003323,&B3BB8888
670 DATA&99111111,&1177BB33,&663311
680 DATA&EEEEEEFF,&115533EE,&E6E6F770
690 DATA&6F0F0870,&ECECECC0,&E0E02C0
700 DATA&F1F7F5F,&70870F0F,&ECE4ECE
710 DATA&C02C0E0E,&B0B0734C,&F4F4F070
720 DATA&D0D0EC23,&F2F2F0E0,&F8F8F0F4
730 DATA&F4F3F0,&F1F1F0F2,&F2FEF0,0,0
740 DATA0,0,0,0,0,0,&FFB99937,&E7F2244
750 DATA&FFD999CE,&7EF4422,&38B3A0B
760 DATA&E0E00606,&C1DC50D,&70700606
770 DATA&A4A0A0E,&3344440E,&5250507
780 DATA&CC222207,&8C8CCF77,&B377EECF
790 DATA&13133FEE,&DCEE773F,&606033
800 DATA&11331111,&88444488,&880000
810 DATA&11111111,&33333333,0
820 DATA&88888888,&4030,&20000000
830 DATA&2024080,&2020202,&F7FE7721
840 DATA&F0FFF77,&EAE2EE02,&F0FE6E6
850 DATA&F3F3FCFC,&FCFC,&C2C2CECE
860 DATA&202CECE,0,0,&2020202
870 DATA&60600202,&54AAAA99,&25070310
880 DATA&C0888800,&F0F0EC0,&7070707
890 DATA&7070707,&D0D0F0F,&F0D0F0D
900 DATA&B0B080F0,&B0B0B0B0,&F0F010F0
910 DATA&D2F0F0F0,&B0B0B0B0,&F0B0B0B0
920 DATA&F0F0F0D0,&F0F0F0F0,0,0,0,0,0
930 DATA0,0,0,&FFB99937,&E7F2244
940 DATA&FFD999CE,&7EF4422,&38B3A0B
950 DATA&E0E00606,&C1DC50D,&70700606
960 DATA&8F233355,&203058F,&1F4CCCAA
970 DATA&40C0A1F,&33B3EE01,&203391FF
980 DATA&CCDC7708,&40CC98FF,&58D0C042
990 DATA&D0D094C1,&80848000,&A0A1A080
1000 DATA&101861F0,&10101010,&80C0E0A0
1010 DATA&80808084,&F050310,&101010F
1020 DATA&80808008,&1E181890,&A090701
1030 DATA&228A0A,&20E0E0E,&1145090B
1040 DATA&110301,&16070301,&EE8C0E0C
1050 DATA&E0C8C4C,&1E3C5A3C,&71E3C
1060 DATA&4B870F86,&E0F87,&1113311
```

Turn to Page 90 ►

◀ From Page 89

```
1070 DATA&B3734030,&888CC88,&5C6C20C0
1080 DATA&F7F7F7F7,&307373,&9A367E7E
1090 DATA&C0ECEC,-1,&FFFF4F4F,&EEEEEEEE
1100 DATA&EEEE8E8E,&FFFF4F4F,&FF4F4F
1110 DATA&EEEE8E8E,&EE8E8E,0,0,0,0,0,0
1120 DATA0,0,&FFB99937,&E7F2244
1130 DATA&FFD999CE,&7EF4422,&38B3A0B
1140 DATA&E0E00606,&C1DC50D,&70700606
1150 DATA&55779988,&55447757,&AAEE9911
1160 DATA&AA22EEAE,&33333377,&111111
1170 DATA&CCCCCCEE,&CCAAAA98,&43434342
1180 DATA&4243,&C0C8C00,&8888888C,0,0
1190 DATA&88888888,&888888,&1030,&F0F0
1200 DATA&60C08000,&C060F0F0,&F0F03010
1210 DATA&1030,&F0F00080,&60C08000
1220 DATA&BABB88FF,&BBBBBAB9,&FFDD11FF
1230 DATA&BBBB89D5,&BAB9BABB,&FF88BB
1240 DATA&FFD589BB,&FF11DD,&101010
1250 DATA&1010101,&E0E0E0,&E0E0E0E
1260 DATA&F060101,&FF0F0F,&E0E0E0E
1270 DATA&66060E,&808080F0,&80808080
1280 DATA&101010F0,&54101010,&80808080
1290 DATA&F0808080,&10101054,&F0101010
1300 DATA0,0,0,0,0,0,0,0,&FFB99937
1310 DATA&E7F2244,&FFD999CE,&7EF4422
1320 DATA&38B3A0B,&E0E00606,&C1DC50D
1330 DATA&70700606,&F0707270,&50E0F0
1340 DATA&F0E0E4E0,&A070F0,&65505030
1350 DATA&765021,&6AA0A0C0,&E6A048
1360 DATA&77571304,&75737777,&EECE0A08
1370 DATA&E4EEEEEE,&77777776,&1133
1380 DATA&EEEEEEEA,&88AA,&8080F07
1390 DATA&B0F3B08,&1010F0E,&D0F0101
1400 DATA&2E3F5B4B,&CC00F04B,&47CFAD2D
1410 DATA&3300F02D,&20702,&6070300
1420 DATA&CC10F01,&C0C0C0C,&44000606
1430 DATA&44440044,&C00C0C0C,&C0C0C
1440 DATA&70902050,&340F030,&D0E0E040
1450 DATA&68F0E0F0,&2078F02,&2050301
1460 DATA&3C386878,&4020E1C,&407040F0
1470 DATA&40704070,&20E020F0,&20E020E0
1480 DATA&40704070,&704070,&20E020E0
1490 DATA&E020E0,0,0,0,0,0,0,0,0
1500 DATA&FFB99937,&E7F2244,&FFD999CE
1510 DATA&7EF4422,&38B3A0B,&E0E00606
1520 DATA&C1DC50D,&70700606,&70503403
1530 DATA&EEDC7460,&B1F15B0E,&33F7F3F1
1540 DATA&773BBBBB,&3033366,&EECDDDDD
1550 DATA&3033322,&16160702,&34241434
1560 DATA&86860E0C,&C24282C2,&74643C3C
1570 DATA&30210,&E262C3C3,&C0480
1580 DATA&77333311,&70777677,&EECCCC88
1590 DATA&E0EEEEE6,&2337777,&101000
1600 DATA&4CCEEEE,&808000,&10101133
1610 DATA&10101010,&C0C08000,&C0C0C0C0
1620 DATA&30101010,&44763030,&C0C040C0
1630 DATA&8080,&40404030,&10101030
1640 DATA&202020C0,&C0,&10101010
1650 DATA&10101010,&80E0000,&E0A0C0E
1660 DATA-1,&AAFFFFFF,-1,&AAFFFFFF
1670 DATA&FFFFFF55,-1,&FFFFFF55
1680 DATA-1,0,0,0,0,0,0,0,0,&FFB99937
1690 DATA&E7F2244,&FFD999CE,&7EF4422
1700 DATA&38B3A0B,&E0E00606,&C1DC50D,"
```



Avoid the bombs on Level 2

Get it right!

```
  10 =    0 0 |  350 = AD9D 6 |  690 = 61CC 6 | 1030 = 78C6 D | 1370 = F001 8
  20 =    0 0 |  360 = 907B 6 |  700 = B2B7 E | 1040 = F07E 4 | 1380 = 7ED3 8
  30 =    0 0 |  370 = 306D 3 |  710 = 442D 1 | 1050 = 18ED 0 | 1390 = 6EF9 F
  40 = 1FDD D |  380 = 96F0 3 |  720 = 1EA3 8 | 1060 =  DB9 9 | 1400 = 2A1E E
  50 = 2140 E |  390 = 3F81 6 |  730 = E7E4 3 | 1070 = ABF0 C | 1410 = 5783 3
  60 =  4A3 6 |  400 = B895 2 |  740 =  807 C | 1080 = 5AAA 3 | 1420 = E7FE 6
  70 = CCF2 A |  410 = 9C6B A |  750 = 5EF2 F | 1090 = 8F39 3 | 1430 = 606D E
  80 =  394 9 |  420 = 67F3 7 |  760 = 35CD A | 1100 = FC74 1 | 1440 = 420B B
  90 = 9FA3 F |  430 = 651D 3 |  770 = F34A 7 | 1110 = 4B14 E | 1450 = C09D C
 100 = FD2E 0 |  440 = 80FF B |  780 = B44F A | 1120 = 270A 7 | 1460 = 21F0 1
 110 = F020 F |  450 = 3F90 D |  790 = 65D6 E | 1130 = 5EF2 5 | 1470 = D068 8
 120 = F725 2 |  460 = 5F02 7 |  800 = 3125 E | 1140 = 35CD 7 | 1480 = 7630 1
 130 = 528A 1 |  470 = A210 7 |  810 = 63F8 5 | 1150 = 710E E | 1490 = 3A51 6
 140 = 20A4 C |  480 = 91F3 4 |  820 = 667B E | 1160 = 6D36 9 | 1500 = 6C65 F
 150 = C52C 6 |  490 = B5B5 6 |  830 = 8013 E | 1170 = F240 C | 1510 = 3955 1
 160 = 22D7 C |  500 = 6E20 3 |  840 = 602B D | 1180 = 6E4E E | 1520 =  4B8 C
 170 = E46B 1 |  510 = F0BF C |  850 = A944 8 | 1190 = 462E 9 | 1530 = AB4F 0
 180 = E46B 5 |  520 = 773B C |  860 = AF35 1 | 1200 =  A42 6 | 1540 = FE60 2
 190 = A7C3 4 |  530 = 5C95 8 |  870 = B1AF 9 | 1210 = 546E 6 | 1550 = C767 D
 200 = F2E6 1 |  540 = D250 B |  880 = 1327 A | 1220 = 9027 B | 1560 =  1DE 9
 210 = FA39 8 |  550 = 270A 5 |  890 = 7D2B 7 | 1230 = 78AB E | 1570 = 9BDF 0
 220 = C64C F |  560 = 5EF2 4 |  900 = 501E D | 1240 = 8FC4 B | 1580 = C395 4
 230 = 3D5F 4 |  570 = 35CD 4 |  910 = E80B 8 | 1250 = C750 5 | 1590 = 1EDA 3
 240 = 4B7F 6 |  580 = C104 A |  920 = C9FF C | 1260 = 2AC3 4 | 1600 = C484 E
 250 = FD20 8 |  590 = 2517 1 |  930 = 44CB E | 1270 = B33F 2 | 1610 = 923C 8
 260 = F4BB 3 |  600 = 92B2 5 |  940 = 5EF2 B | 1280 = 6C03 A | 1620 = 5B76 1
 270 =  E8F B |  610 = 6B22 0 |  950 = 35CD 5 | 1290 = 7C79 D | 1630 = CA4E B
 280 = 9B18 0 |  620 = 116C 9 |  960 = D983 A | 1300 = 2CC3 2 | 1640 = CE36 C
 290 = 711E B |  630 = 479F 0 |  970 = 34CF C | 1310 = 110A E | 1650 = A392 A
 300 =   30 4 |  640 = 6D4A A |  980 = FEEF 3 | 1320 = 36F3 D | 1660 = EE69 4
 310 = 66CB A |  650 = A648 6 |  990 =  386 F | 1330 = B996 8 | 1670 = 8B05 0
 320 = CBA1 A |  660 = 1481 5 | 1000 = 7DC0 9 | 1340 = 25A9 D | 1680 = 3450 B
 330 = E3CB 4 |  670 = 4D24 9 | 1010 = 1B79 2 | 1350 = 7D97 9 | 1690 = 110A F
 340 =  CEB 3 |  680 = 9EE2 5 | 1020 = CF9C B | 1360 = D38C A | 1700 = A694 2
```

```
   10 REM 5-Alive part 1
   20 REM by Mike Goldberg
   30 REM (c) The Micro User
   40 MODE7:VDU23;8202;0;0;0;
   50 ENVELOPE1,1,5,50,5,4,4,4,126,-1,-1
,-4,120,120
   60 ENVELOPE2,1,13,-3,-30,5,50,5,126,-
1,-1,-3,120,120
   70 ENVELOPE3,1,-2,2,0,19,9,9,126,-1,-
1,-3,60,60
   80 ENVELOPE4,1,-2,0,0,255,0,0,120,-1,
-1,-1,0,0
   90 ENVELOPE5,1,4,-4,4,5,5,5,120,-1,-1
,-2,120,120
  100 ENVELOPE6,1,0,-8,8,4,5,89,120,-1,-
1,-2,124,120
  110 ENVELOPE7,1,1,-1,0,1,1,0,120,-1,-1
,-3,120,120
  120 ENVELOPE8,1,0,0,0,0,0,0,120,0,0,-1
,100,100
  130 ENVELOPE9,1,0,0,0,0,0,0,120,-1,-2,
-5,120,120
  140 ENVELOPE10,2,90,-40,3,51,2,7,126,-
1,-1,-1,120,120
  150 PROCinstruct:*FX20
```

Turn to Page 122 ▶

Listing II

MICRO MEDIA Computer Supplies Ltd.

ALL PRICES INC. OF DELIVERY AND VAT – ALL PRICES INC. OF DELIVERY AND VAT

5¼ Unbranded Discs

Price per	25	50	100	250
SS/DD	8.90	14.90	26.88	61.90
DS/40T	9.90	15.90	27.88	63.00
DS/80T	10.90	17.90	32.96	73.50
DS/HD PCAT's	23.90	39.90	73.88	173.20

5¼ Colour Discs (5 colours)

Price per	25	50	100	250
DS/40T	12.45	23.56	38.92	89.20
DS/80T	13.45	25.94	46.20	97.50

5¼ Reversible

Price per	25	50	100	250
DS/40 & 80T	14.50	26.94	49.48	107.20

Price per	10	20	50	100
3½ DS	10.90	20.94	46.15	86.00

5¼ MICRO MEDIA Brand Discs

Price per	25	50	100	250
SS/DD	5.75	10.90	25.50	46.50
DS/40T	6.75	12.74	29.85	57.20
DS/80T	8.50	15.96	36.25	71.30
DS/HD PCAT's	14.50	27.90	66.50	127.20
Reversible	8.50	15.96	36.25	71.30

All discs supplied are with labels 5¼" write protects, envelopes & hub rings. 100% certified error free. Lifetime guarantee.

3½ MICRO MEDIA Brand Discs

Price per	25	50	100	250
DS 135TPI	14.15	27.30	64.80	124.00
DS HD 2MB	36.90	70.60	167.95	311.50

Printer Ribbons

Price each Ribbon	2	6	12
Canon 1080/1156	2.99	2.85	2.60
R, BL, GR, BR, Y	3.99	3.85	3.70
Centronics GLP	3.65	3.45	3.15
R, BL, GR, BR, Y	4.65	4.40	4.00
Citizen 120D/LSP10	3.60	3.40	3.25
Epson M.F & RX80, F & LX800	2.99	2.75	2.55
R, BL, GR, BR	4.35	4.20	4.05
Epson LX80/86 GX80	2.80	2.65	2.40
R, BL, GR, BR, Y	3.80	3.65	3.40
Juki 6100 MS	2.85	2.70	2.60
R, BL, BR	2.95	2.80	2.70
Kaga KP810/910	2.99	2.85	2.60
R, BL, GR, BR, Y	3.99	3.85	3.70
NEC P2200	4.95	4.60	4.25
Panasonic KXP1080/1/2/3	3.99	3.80	3.60
R, BL, GR, BR	6.50	6.20	5.85
Shinwa CP80MS	3.99	3.80	3.60
Star NL10	4.95	4.60	4.25
R, BL, GR, BR	6.15	5.85	5.55
Star LC10	3.50	3.10	2.85
R, BL, GR, BR	4.90	4.60	4.25
Star LC24-10	3.99	3.80	3.60

Please mix colours and types for best prices.
R = Red, BL = Blue, GR = Green, BR = Brown, Y = Yellow

If the ribbon you require is not listed please let us quote.

Computer Paper

Plain fanfold, micro perf edges

Size	Weight gsm	1000's per bx	Price per box 1 box	3 bxs	5 bxs
11x9½	60	2000	14.95	14.45	13.65
11x9½	70	2000	18.45	16.05	15.15
11x9½	80	2000	20.25	18.55	16.45
A4 11⅔x9¼	70	2000	20.95	19.70	18.45
A4 11⅔x9¼	80	2000	24.55	23.05	20.15
A4 11⅔x9¼	90	1000	14.25	13.15	14.15

Computer Labels

Continuous fanfold, sprocket fed

Price per 1000	1000	3000	5000
70 x 36 2¾x1 7/16	4.85	3.85	3.55
89 x 36 3½x1 7/16	5.35	4.50	4.10
89 x 49 3½x1 15/16	6.60	5.90	5.40

Please state no of labels across sheet (1, 2 or 3)

Disc Storage Boxes

Price each	1+	3+	6+
MD 120 5¼ x 120	9.95	8.95	7.60
MD 100 5¼ x 100	8.90	7.99	7.40
MD 50 5¼ x 50	6.10	5.65	4.80
MD 80 3½ x 80	8.90	7.99	7.40
MD 180 5¼ x 180	19.90	18.90	17.95
MD 150 3½ x 150	20.95	19.25	18.90

Printer Stands

Price each			
PS10 80 col	28.50	27.25	25.30
Wire 80 col	11.10	9.90	8.95

Swivel Bases

Price each			
12" 55 x 280 x 260 mm	11.90	10.40	9.60
14" 55 x 355 x 320 mm	13.50	11.80	10.90

HOW TO ORDER

BY PHONE

LEICESTER 0533 856622
OUT OF OFFICE HOURS (ANSWER MACHINE)

BY POST MICRO MEDIA, DEPT. MU,
FREEPOST, UNIT 3, CUTTERS CLOSE,
NARBOROUGH, LEICESTER LE9 5FZ (NO STAMP REQUIRED)

BY FAX LEICESTER 0533 858932

PERSONAL CALLERS LEICESTER – SORRY NO PERSONAL CALLERS
POTTERS BAR – PERSONAL CALLERS WELCOME – MICRO MEDIA,
Rydal Mount, Baker St., Potters Bar, Herts.
Mon to Fri 10.00am - 4.00pm

OFFICE HOURS Leic. Mon to Fri 8.30am - 6.30pm

DESPATCH DELIVERY WITHIN 24 HRS PLEASE ALLOW 5 DAYS

For guaranteed next day delivery please phone – from £2.50 EXTRA. Postage covers UK only.

MINIMUM ORDER VALUE

FOR PAYMENT WITH ORDER MIN VALUE £8.90 or £1.50 HANDLING CHARGE.
FOR ACCOUNT CUSTOMERS MIN VALUE £15.00 or £3.00 HANDLING CHARGE.

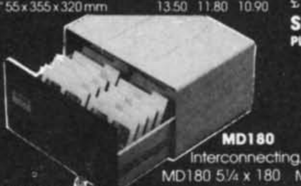
SPRING CATALOGUE OUT NOW
PLEASE RING OR WRITE FOR YOUR FREE COPY

MD120
5¼ x 120

Anti-static Lock lid

MD100
5¼ x 100

PS10



MD180
Interconnecting, Stackable
MD180 5¼ x 180 MD150 3½ x 150

Swivel Base
Adjusts by front dial turns 360°
Tilt up & down 25°

-MICRO MEDIA- TEL: LEICESTER 0533 856622 -MICRO MEDIA- TEL: LEICESTER 0533 856622 -MICRO MEDIA-

---

ECONET 89

The fourth annual conference for network users

The Microtechnology Centre
Manchester Polytechnic

September 11th – 12th
1989

Delegates will be able to select their own series of activities from a number of parallel options available during the two days. Sessions will include: information for new network managers, advanced network users, using networks in various curriculum areas, communication, software development and discussions on a range of relevant issues.

- WORKSHOPS providing the opportunity for valuable hands on work with a range of equipment and software, for both the new and the experienced network users.
- SEMINARS discussing a wide range of technology and education issues.
- EXHIBITION for the duration of the conference.
- FURTHER DETAILS if you would like further information and a booking form please return the coupon below to:

Econet 89
Acorn Computers Limited
Fulbourn Road
Cherry Hinton
Cambridge CB1 4JN

Acorn
The choice of experience.

Name Mr|Mrs|Ms ....

Organisation ....

Position ....

Address ....

....

....

Telephone ....

ACORN and ECONET are trademarks of Acorn Computers Limited.
Copyright © Acorn Computers Limited 1989.

Watford Electronics

Jessa House, 250 Lower High Street, Watford WD1 2AN, England
Tel: Watford (0923) 37774 Tlx: 8956095 Fax: 01 950 8989
Shop Hours: 9am to 6pm (Mon.-Sat.) Thursdays 9am to 8pm
All prices exclusive of VAT; subject to change without notice & available on request.
Credit Card Orders (ACCESS & VISA) Tel (0923) 33383 or 50234 (24 Hours)

Acorn
The choice
of Experience

The choice
before and after
the experience

Archimedes micro

Now supplied with the New RISC OS

System	Basic	Mono	Colour	Multiscan
305	£725	£785	£924	£1869
310	£899	£859	£1098	£1318
310M	£959	£1019	£1158	£1379
410	£1199	£1259	1398	£1619
420	£1699	£1759	£1898	£2119
440	£2529	£2589	£2728	£2948

(Securicor carr. £10 on Archimedes)

SPECIAL OFFER

Buy an Archimedes micro from us at above prices and we will conbtribute 10% of the money you spend, towards the purchase of a printer, disc drive or any Hardware or Software of your choice.

ACCESSORIES

● NEW Multitasking RISC OS	£39
● 0.5 Mb RAM for 305	£139
● ROM Podule Acorn	£56
● ROM Podule (Computer Concepts)	£45
● ROM Podule (C C) with Battery Backup	£59
● 2 Podule Backplane + Fan (Acorn)	£37
● 2 Podule Backplane (Watford)	£25
● 4 Podule Backplane (Watford)	£38
● Backplane FAN only (for Hard Disc)	£9
● 2nd 800K Floppy Drive (305/310)	£118
● I/O Podule (with Analogue port, User port, & 1MHz bus)	£80
● MIDI add-on to I/O Podule	£37
● MIDI Expansion Card	£65
● Sound Sampler (Armadillo)	£129
● Chromalock Podule	£280
● 20 Mb Hard Disc & Controller Card	£469
● Watford's latest 20 Megabyte Hard Disc, Controller Card & Utilities Software	£379
● Econet Network Board	£49
● Archimedes IEEE Interface Adaptor	£269
● Dual RS232 Podule	£195
● 16 bit parallel I/O Card	£195
● PC Emulation Pack incl. MSDOS 3.21	£65
● Archimedes Reference Manual	£29
● Arm Assembly Lang. Prog. Manual	£15

RISC OS Now available from stock

WORDPROCESSORS

Wordwise +	£18	Pipedream	£89
Image Writer	£25	P. Spellchecker	£40
Interword ROM	£35	View	£49
1st Word Plus	£75	Viewspell	£32
Archie Spell Master	£3º	ViewIndex	£12

DATABASES

AlphaBase	£39	Flying Start II	£80
Viewstore	£49	System's Delta+	£60

SPREADSHEETS

Intersheet ROM	£35	Viewsheet	£49
Sigmasheet			£59

BUSINESS GRAPHICS

GammaPlot	£59	Interchart ROM	£25

INTEGRATED PACKAGES

Logistix – Database, Spreadsheet, Time Management & Business Graphics £94

By popular demand, we are now supplying refurbished and fully guaranteed BBC Micros with Disc Filing System
(Please telephone for price & availability)

Computer Concept's Software for Archimedes on Disc

Interword	£27	Spell-Master	£48
Interchart	£27	Intersheet	£27

GRAPHICS, ART, DESIGN & GAMES

Artisan	£31	Gamma Plus	£60
Pro Artisan	£140	Graphic Writer	£23
Support Disc	£16	Autosketch	£69
Toolkit (Beebug)	£32	Toolkit (Clares)	£31
Arc Termulator	£56	Zarch	£16
Alerian	£12	Conquerer	£20
Minotaur	£11	Missile Control	£13
Kermit	£46	Enthar Seven	£29
Archeffect	£20	Archeffect	£20
ArcTFS	£25	Lingenuity Presenter	£24
Render Bender	£66		

MINERVA's Archimedes Software

Sigmasheet	£57	Gammaplot	£57
Deltabase	£24	System Delta+	£69
System Delta + Reference Manual			£25
Order Processing*	£53	Sales Ledger*	£53
Stock Manager*	£53	Purchase Ledger*	£53
Nominal Ledger*	£53	Reporter	£20
School Administrator			£66

*** Requires System Delta**

Archimedes to BBC SERIAL LINK

Using this simple data link, it is possible to solve all your BBC to Archimedes data transfer problems. The kit is supplied with a disk, and the necessary cable to connect the two computers. Using this package it is possible to transfer any data from the BBC to Archimedes at upto 19200 baud.

Onlv £15

Archimedes 5¼"/3½" Disc drive Interface

With this interface it is possible to connect almost any 5¼"/3½" disc drive with its own power supply to the Archimedes. NO SOLDERING is involved. Supplied complete with necessary lead.

Only £21

Note: This is not simply a lead. Attempting to connect an external disc drive by direct connection may result in damage to your Micro.

Watford's 20Meg & 40Meg Archimedes Hard Disc

Watford Electronics' 20Meg & 40Meg hard disc fits internally into the Winchester slot provided It is fully compatible with Acorn's hard disc upgrade, (the only difference is our low price). Price includes the Hard Disc Drive, Controller Podule & fitting instructions.
P.S. This upgrade requires a backplane and a fan.

Arch HD20 – 20Meg Hard Drive	£379
Arch HD40 – 40Meg Hard Drive	£425
Backplane for 2 Podules	£25
Backplane for 4 Podules	£38
Slimline Quiet Extractor Fan	£9

CREDIT TERMS now available.
In these days of expensive borrowing, we have negotiated a special deal for our customers, which allows us to offer you, low cost finance scheme at 12.5% interest rate. (24.5% APR). For further details please telephone or write in.

LANGUAGES (Archimedes)

ANSI 'C'; ISO-PASCAL; FORTRAN 77; all Release II.	£94 each
Cambridge LISP; PROLOG X	£181 each
LOGOTRON LOGO	£55
BASIC Compiler	£89
Archimedes Assembler	£189
TWIN EDITOR	£27

BBC MASTER

MASTER 128K Micro incl. Acorn's: View, Viewsheet, ADFS, BASIC Editor & TERMINAL plus £35 worth of FREE OFFER (see below) **£439**

FREE . . . £50 worth of Software

Gemini's OFFICE MATE & OFFICE MASTER packages on Disc consisting of: Database, Spreadsheet, Beebplot graphics. Accounts packs: Cashbook, Final Accounts, Mailist, Easyledger, Invoice & Statements, Stock Control, and the popular, Master Advanced Reference Manual.
With every BBC Master purchased from us this month.

BBC Master with Turbo Board + above SPECIAL OFFER £549

Securicor Carriage on Micros £7

ADD-ONs & ACCESSORIES

Turbo 65C102 Add-on Module			£118
Econet Module for the Master			£49
Twin ROM Cartridge for Master			£8
Quad ROM Cartridge for Master			£12
Universal Processor Adaptor			£75
Master Reference Manual I		(No VAT)	£14
Master Reference Manual II		(No VAT)	£14
Master Advance Ref. Manual		(No VAT)	£18
64K Upgrade Kit for B+			£32
Acorn 1770 DFS Kit complete			£49
ECONET Upgrade Kit for BBC			£42
ALL ECONET UPGRADES Available			
ARIES' Professional IEEE Interface			£238
Morley Teletext Adaptor with ATS Rom			£99
Filestore E01S	£899	Filestore E40s	£799
Filestore E60S	£1080	Ecolink	£270

BBC MASTER COMPACT

System 1	Standard Package	£305
System 1A	System 1 + TV Modulator	£329
System 2	System 1 + Green Hires Monitor	£359
System 3	System 1 + Medium Res Colour Monitor	£469
RS232 Kit for BBC Compact		£25
Additional 3½" Drive for BBC Compact		£90

(Securicor carriage £10)

65C102 2nd PROCESSOR

This amazing package consists of the Acorn 65C102 'Turbo' Board, the Watford Co-Pro Adaptor and Acorn 1.2 DNFS ROM. The 'Turbo' board, running at 4MHz with 64k of additional RAM will increase the speed by between 50 and 200% depending on the application running, and allow a BASIC program of upto 44k in any screen mode. Simply by plugging in the Co-Pro and the DNFS ROM with its special Tube host code and you massively increase the power of any Model B. This is a complete package, with its own power supply, ready to interface with your BBC Micro.

£159

CO-PRO Adaptor

CO PRO ADAPTOR

With this Watford's Co-pro Adaptor unit, you can now attach any BBC Master's coprocessors to your original BBC B.

Use the super fast Turbo Board with your BBC B, it is much faster than the 6502 2nd processor superseding it.

With the 512K addon your standard BBC machine achieves IBM PC compatibility at a realistic price running GEM, Lotus 123 and many other programs. Included with the 512k package is a high precision mouse and the Digital Research GEM suite of software; GEM Desktop, GEM Write GEM Paint. This requires both the 1770 DFS and the ADFS to be fitted to your computer.

To use other co-processors you require a BBC B with DNFS 1.20 or higher, or BBC B+ fitted with 1770 DFS 2.20 or greater. Co-processors work exactly like a second processor.

Master owners may use Co-Pro Adaptor to add a second Co-processor externally.

Watford, brings power to your BBC at only:

£35 (carr £5)

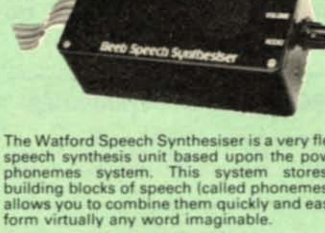
REPLICA 3

This new improved REPLICA 3 from Clares is a very powerful disc based TAPE to DISC Utility. It now transfers even more programs than ever before. Replica 3 will not work with all programs but then neither will anything else. 30,000 Replicas have been sold to date. It has to be good.

£15 (40 or 80 track)

Acorn's Speech Synthesiser package, complete
Special Offer £15
BBC B Micro only

Versatile **BEEB SPEECH SYNTHESISER** Unit



The Watford Speech Synthesiser is a very flexible speech synthesis unit based upon the powerful phonemes system. This system stores the building blocks of speech (called phonemes) and allows you to combine them quickly and easily to form virtually any word imaginable.

Supplied with an advanced ROM, you are provided with a 500 word dictionary to get you started. These can easily be added to by following the notes given in the comprehensive manual.

SPECIAL PRICE £32 (carr £2)

VOLTMACE JOYSTICKS

Delta 3B Single Joystick	£10
Delta 3B Twin Joysticks	£15
Delta 3C Joystick for Compact	£10
Delta 14B Single Joystick	£11
Delta 14B/1 Adaptor Module	£12
Transfer Software Disc-Tape	£7

NEW

The Complete Mouse User Guide to BBC Micro

This manual has been written to reveal the secrets of the mouse. It explains all the principles required by the hardware and associated software, and also example listings for inclusion into custom programs. The manual first details the basic principles of the mouse and a simple program which uses these principles. This information should be adequate for most applications. However, it is possible to improve the performance of the mouse by expanding on the principles already used in the software. This is again fully explained and an example program given.

It is possible to gain a full understanding of the mouse from this manual. For those not interested in exactly how the mouse functions, complete example programs are also included. These may be typed directly into the micro, without the need for any understanding of the hardware or software involved, enabling the mouse to be used for custom applications.

Price	**£5.95** (No VAT)
Example programs on Disc	**£4.95**

Archimedes Real-Time Digitiser

Watfords' Archimedes Video Digitiser is the most sophisticated digitiser ever designed for a micro. It provides a fast and flexible means of capturing images from a video camera or recorder for display and manipulation on the Archimedes range of Micros. Off-air television signals may also be digitised via a video recorder or TV tuner.

Once captured, Video images can be stretched, squahsed, rotated, stored on disk, printed, or used by applications software.

Applications include desktop publishing, graphics, animation, image analysis and recognition, medical imaging, automatic inspection and measurement, databases, interactive video, remote transmission of pictures via a modem, movement detection ... or anything else you can think of!

SOFTWARE

All driver software for the digitiser is contained in a ROM on the podule. Software facilities are accessed via operating system star (*) commands and SWI calls. A Utility Disk is included containing sample pictures, examples and Utility programs.

RESOLUTION

Images are digitised to 512 (h) x 256 (v) pixels, and then scaled to fit the Archimedes' screen. It is possible to digitise to 512 x 512 pixels if the picture is stationary for about 0.1 second. 512 x 512 images can either be displayed on a MultiSync monitor, or on a normal monitor using interlacing.

Pictures are digitised to 64 levels of grey (6 bits). Note, however, that it is only possible to display all 64 levels on a monochrome monitor, or a colour monitor which has a composite (CVBS) input. For this reason, the Philips CM8533 monitor is recommended instead of the standard Archimedes monitor. It is also possible to connect both a colour and a monochrome monitor at the same time.

Any 2,16 or 256 colour graphics mode can be used to display digitised pictures. In two colour modes, grey levels are represented using dot patterns, which may be redefined if required (a pattern editor is supplied).

SPEED

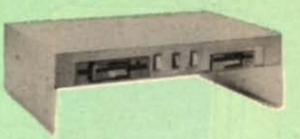
Video fields are captured in real time (1/50th sec.), and then transferred to Archimedes' memory or the screen. The grab/display rate is dependant on the screen mode and picture size, up to 25 fields per second for quarter screen images, or 12.5 per second for fullscreen (Mode 9).

HARDWARE

The digitiser is a single width podule, with a BNC socket on the rear panel for the video input, which may optionally be terminated via a link. There is 128K of on-board memory to store the digitised image, and a 32K ROM on the podule contains all the driver software.

Price £249

Disc Drives DP35-800S



A Double disc drive – with a difference! Times are changing fast for the floppy disk, and whilst the current standard for the BBC B and Master Series is the 5.25 inch disk, the standard for the future will most certainly be the smaller; faster and more reliable 3.5 inch disks – now a standard feature of both the Master Compact and the Archimedes Series.

To support the present disc drive users, and cope with the future, we have designed our own plinth-mounted disk system – called the DP35 800S, it contains both the 5.25 inch and the 3.5 inch drive formats as well as offer a firm and rigid support for a monitor on top. With the BBC Micro underneath, the plinth makes a surprisingly small footprint on the desk – leaving you more space to work with.

The 5.25" disc drive is 40/80 track switchable. For ease of access, the switches are front mounted. DP35-800S has its own power supply, independent of the BBC Micro.

Watford's new plinth enables users to read, write and format disks both in DFS and ADFS format – currently the accepted standard for the Master Compact and the Archimedes, it also enables the user to read disks written for the Archimedes. Ideal for both BBC & Master.

Launch Offer: **£165** (carr. £7)

Z88 Sinclair's Portable Micro

The worlds first, truly portable Micro. It is A4 size, only an inch thick and weighs under 2lbs. Ideal for use when travelling or as a personal organiser.

Only: **£199**

FREE

With every Z88 purchased from us this month, we are giving away absolutely FREE, a Z88 to BBC Interface Link, 4 rechargeable batteries and a compact Mains Battery Charger worth £38.

ACCESSORIES

Mains Adaptor	£8.65
32K RAM Pack or 32K EPROM Pack	£17.35
128K RAM Pack or 128K EPROM Pack	£43.40
512K RAM Pack	£169
Z88 Spellmaster for Pipedream	£51
Z88 to BBC Link	£22
Z88 to PC Link II	£30
Z88 to Macintosh	£49
● Z BASE	£56
● Z TAPE	£42
● Z TERM	£42
Z88 EPROM ERASER	£34.75
Serial Printer Cable	£8.65
Parallel Printer Cable	£24.00
Z88 Modem	£145
Z88 Soft Carrying Case	£8.50
Sinclair Z88 Computing Book	£9.95
AA Nicad Rechargeable Battery	£1.50
Battery Charger, Compact & Fast (3 Hours)	£6

Continued →

MONITORS

All Monitors are supplied complete with BBC connecting leads FREE.

MICROVITEC 14"

● 1431 – Standard resolution as used on the BBC television computer programme	**£175**
● 1451 – Medium resolution, suitable for word processing in mode 0	**£219**
● 1441 – High res, exceeds the capabilities of the BBC micro	**£359**
● 1431AP RGB + PAL and AUDIO	**£199**
● 1451AP RGB + PAL and AUDIO	**£255**
● **2030 CS 20" Med Res**	**£380**
● **2040 CS 20" Hi Res**	**£675**
● Dust Cover for Microvitecs	**£5.50**
● **Touchtec 501 Touch Screen**	**£239**

14" MULTISCAN COLOUR

● **TAXAN** Multisync 770 Plus	**£439**
● **EIZO** 8060H – For technical info. read the review in Micro User, Jan. '89	**£439**
● **EIZO** 9060S .28 resolution	**£458**

TAXAN 12"

● Super Vision 2 **Type 620** Hi-res RGB Colour, Green/Colour Switch	**£265**
● Super Vision 3 – **Type 625** Super Hi-res RGB Colour, Green/Colour Switch	**£315**

Taxan High Resolution MONOCHROME Monitors with long persistence tube to reduce flicker.

● KX117 Green	**£69**
● KX119 Amber	**£72**

PHILLIPS

● BM7502 12" Hi-res Green Monitor	**£65**
● CM8833 14" Med. Res Colour Monitor	**£219**

STAR BUY

- **PHILLIPS 14"** Medium Res, dark glass, attractively finished Colour Monitor – supplied complete with RGB, SKART and Audio/Phono Inputs. A push-button switch toggles between Hi-Res monochrome green text mode and full colour display. (Please state the type of Connecting Lead you require).

ONLY £199

Dust Cover for Phillips Monitors	**£6**

SPARE LEADS

BNC Lead for Zenith or Philips	**£3**
Skart Monitor Lead	**£5**
RGB lead for TAXAN Monitors	**£3**
Archimedes Colour Monitor Lead	**£7.50**

SWIVEL BASES

By simply placing your monitor on one of our front adjustable professional swivel bases (see drawing at the top), you can easily adjust the monitor viewing angle.

for 12" Monitors **£8** (carr. £2.50)

for 14" Monitors **£12** (carr. £2.50)

TAXAN KP-815 PRINTER

Offer Price £155

Taxan KP915 132 Column	**£275**
RS232 Interface	**£49**
RS232 Interface with 2K Buffer	**£69**
RS232 Interface with 16K Buffer	**£89**

Panasonic KX-P1081

UK's most popular printer.

(Price inludes, FREE a 4ft Printer Lead, and a Dump Out 3, Screen Dump ROM worth £35 with every printer purchased from us).

SPRING SALE OFFER only: **£139**

Optional RS232 Interface:	**£39**

NEW

Panasonic KX-P1124

Watford Electronics, your authorised Panasonic Premier Dealer, brings you from the prodigious Panasonic Stables, this fabulous 24-pin printer.

Available NOW at a superbly realistic price, KX-P1124 perfectly balances features, quality of construction and Value for Money to produce the printer of tomorrow, here today, ready to sweep the current generation of machines away.

At less than 53dB, this is perhaps the quietest dot matrix printer on the market.

Watford's Launch Offer: **£269**

Panasonic Printers

● **KX-P1180** 9pin 80col. 192/38 CPS	**£169**
● **KX-P1540** 24pin 136col. 240/80 CPS	**£435**
● **KX-P1592** 9pin 136col. 216/45 CPS	**£275**
● **KX-P1595** 9pin 136col. 288/61 CPS	**£355**
● **Panasonic KX-P4450** LASER PRINTER Latest technology at Watford's special offer price	**£1,499**

● Spare Toner	**£29**	● A4 Feeder	**£55**

Panasonic Accessories

Cut Sheet Feeders

KX-P1592/1595 (P32)	**£175**;	KX-P1540 (P35)	**£185**
KX-P1124 (P36)	**£88**;	KX-P1180 (P37)	**£79**

BUFFERS

P12 4K Buffer Board for 1081	**£55**
P42 32K Buffer Chip for 1592/1595	**£49**
P43 32K Buffer Chip for 1540	**£49**

Serial Interfaces

P17 P1081/1592	**£32**	P19 P1124/1180	**£55**

PLOTTERS

● Plotmate A4S	**£379**	● Plotmate A3M	**£549**

Roland Plotters

● DXY 880A	**£560**	● DXY 1100	**£630**
● DXY 1200	**£879**	● DXY 1300	**£1035**

INTEGREX COLOUR JET

● Colour Jet 132 Printer	**£515**
● Paper Roll	**£6.50**
● Screen Dump Software	**£10**
● Colour Cartridge	**£14**
● Black Cartridge	**£8**
● 100 A4 OHP transparencies	**£55**
● 8K Serial Interface Optional	**£123**
NEW – Intergrex COLOURCEL NPQ Ink Jet Colour Printer	**£2,695**

NEC P2200 PINWRITER

24 pin; 80 column; 168CPS – 56CPS LQ; Epson LQ compatible, 7K Buffer; 7 resident FONTS, Friction & Tractor feed, front load single sheet feed, etc.

£269

Pinwriter Serial Interface (optional)	**£55**
P2200 Cut Sheet Feeder	**£59**
Additional Font Cartridge	**£25**
NEC P2200 Pinwriter Ribbon	**£6**

NEC PINWRITER P6/P7 Plus

NEC P6 + 80 columns	**£439**	**NEC P7** + 136 columns	**£575**
Colour Option	**£74**	Serial Interface	**£73**
Cut Sheet Feeder	**£125**		

Star Printers

Star LC10	**£169**	LC10 Colour	**£215**
Star LC24-10	**£279**	NB24-10	**£449**
LC10 Colour Ribbon	**£6**	Cut Sheet Feeder	**£65**

Brother HR20 DaisyWheel Printer	**£339**

EPSON PRINTERS

EX800	**£405**	LQ850	**£430**
EX1000	**£564**	LQ1050	**£570**
FX850	**£315**	LQ2550	**£925**
FX1000	**£425**	LQ2500+	**£839**
FX1050	**£439**	LX800	**£169**
LQ500	**£275**	SQ2500	**£975**
GQ3500 Laser	**£1150**		

CUT SHEET FEEDERS for

EX800 **£149**; EX1000/LQ2550 **£210**; FX800 **£149**; FX1000 **£179**; LQ/LX800 **£139**; LQ500 **£75**; LQ850 **£135**; LQ1050 **£175**.

TRACTOR FEED for

EX800/1000 **£85**; LQ800 **£44**; LQ850 **£69**; LQ1050 **£85**; LQ2500 **£195**

ACCESSORIES

● EX800/1000 Colour Option	**£55**
● EX800/1000 Colour Ribbon	**£18**
● LQ2500 Colour Option	**£65**

(Securicor Carriage on Printers £7

EPSON PRINTER INTERFACES

All these interfaces fit inside the printer.

RS232	**£32**	RS232 + 2K Buffer	**£52**
IEEE 488	**£40**	RS232 + 8K Buffer	**£79**

PRINTER LEADS

BBC Centronics 4' long	**£5**
BBC Centronics 6' extra long	**£7**
Compact's Special Centronics Lead	**£7**
Archimedes Printer Lead 1 meter	**£6**
Nimbus Centronics Lead	**£12**
IBM Parallel Lead 1 meter	**£6**
Double Ended 36 way Centronic Lead 4'	**£7**
Double Ended 36 way Centronics Lead 6'	**£9**
MSX Centronics Parallel Lead 4'	**£12**
RS232 Leads (Various)	**P.O.A.**

RS-232 GENDER CHANGERS

Male to Female	**£4.95**
Male to Male	**£4.95**
Female to Female	**£4.95**
25 way Male to 9 way Female	**£4.90**

Listing Paper (Perforated)

● 1,000 Sheets 9½" × 11" Fanfold Paper	£7
● 2,000 Sheets 9½" × 11" Fanfold Paper	£12
● 1000 Sheets 9½" x 11" NCR 2 Part Fanfold	£19
● 1,000 Sheets 15" × 11" Fanfold Paper	£9
● 1000 Sheets true A4 Fanfold Paper 70gms	£11
● 2000 Sheets true A4 Fanfold Paper 70gms	£19
● Teleprinter Roll (Econo paper)	£4

(All our Fanfold paper is Micro perforated leaving a smooth clean edge when the tractor feed strips are detached).

Carriage 1K Sheets £2.50. 2K Sheets £3.00

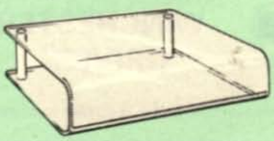
PRINTER LABELS

(On continuous fanfold backing sheet)

1,000 90 × 36mm (Single Row)	£5.00
1,000 90 × 36mm (Twin Row)	£4.90
1,000 90 × 49mm (Twin Row)	£7.50
1,000 102 × 36mm (Twin Row)	£6.25

Carriage on 1,000 Labels £1.00

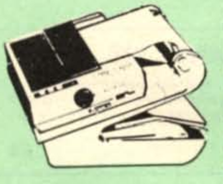
Perspex Printer Stand



Give your Computer System a touch of Class with our elegant, smoke finished Perspex Printer stand. The printer sits on top and the fanfold paper rests neatly underneath, thus occupying the same space as the printer footprint.

Only: £16 (carr. £3)

Professional Printer Stand



This new professional printer stand takes hardly more space than your printer. Due to the positioning of the paper feed and re-fold compartments ie. one above the other, the desk space required for your printer functions is effectively halved. Additional facilities include: Easy access to paper from both sides, used with both top and bottom feed paper and with its dial controlled paper feed system with adjustable deflector plates it ensures smooth paper flow and automatic refolding.

***80 Column version £23** (carr. £3)*

***132 Column version £26** (carr. £3)*

PRINTER RIBBONS & VARIOUS DUST COVERS

Type	**Ribbons**	**Dust Covers**
Brother HR15/20	**£3.00**	–
BBC Micro	–	**£3.50**
BBC Master	–	**£4.00**
Archimedes Micro pair	–	**£9.00**
IBM PCs pair	–	**£6.00**
RX/FX80/MX80	**£3.00**	
DMP2000	**£3.75**	**£4.75**
EX/LQ800	**£4.50**	**£4.50**
EX/LQ1000	**£7.50**	**£5.00**
RX/FX80/85/800/MX80	**£3.90**	–
RX/FX100/1000	**£5.75**	–
Kaga/Taxan KP810/815	**£4.90**	**£4.00**
LC10 (Black)	**£4.25**	**£5.00**
LQ500/800	**£3.75**	**£5.00**
LQ1050/LQ2500	**£8.50**	**£5.50**
LX80/86/800	**£3.80**	**£4.50**
M1009/GLP	**£3.80**	**£3.75**
Panasonic KX1080/81	**£4.00**	**£4.75**
SQ2500	**£23.00**	**£5.50**
Star NL10	**£3.75**	**£4.50**
Olivetti Ink Jet Cartridges (set of 4)	**£9**	

Our attractive Dust Covers are manufactured from translucent PVC. The seams are stitched and edges are taped to prevent splitting due to continuous use.

Universal Printer Sharers/Changers

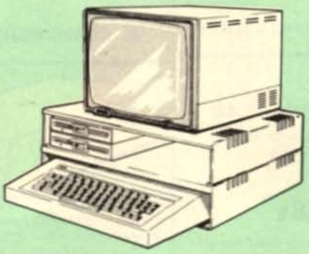
Connect upto 5 Micros to 1 printer or 5 Printers to 1 Micro with our combined, Sharer/Changer. These Units are made to a very high standard. For extreme reliability, they all have Printed Circuit Boards mounted inside the case, (not a Spagetti Junction of wires). Internal connection is made via high quality ribbon cables.

(Ideal for School environments.)

Connects	**Serial**	**Centronics**
2 to 1	£20	£22
3 to 1	£27	£30
5 to 1	£36	£39

(Cables extra at £6 each. Please specify type required when ordering)

PLINTHS FOR BBC MICRO, MASTER & PRINTERS



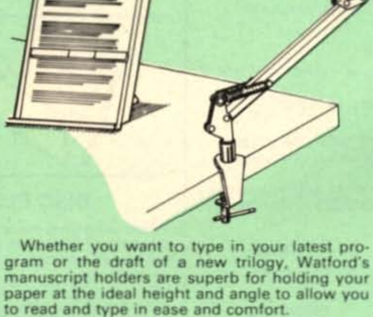
Protect your computer from the heat of your VDU. Our micro plinths have slots for maximum ventilation. The single plinth is suitable for a BBC and VDU, whilst the double height version provides enough room for our stacked disc drive and other peripherals like, Eprom programmer, music unit or simply discs & stationary. The computer slides neatly in the lower section allowing easy access to remove the lid.

The single printer stand is equally sturdy but instead of cooling slots it has elegant cutouts on the sides. This allows easy access to paper from all sides. Colour: BBC Beige.

Single BBC Plinth	420 x 310 x 105mm **£12**
Double BBC Plinth	420 x 310 x 210mm **£20**
Printer Plinth	420 x 310 x 105mm **£12**
Single Master Plinth	490 x 310 x 105mm **£13**
Double Master Plinth	490 x 310 x 210mm **£24**

(Carr. Single plinth 12; double plinth £3)

Copy Holder



Whether you want to type in your latest program or the draft of a new trilogy, Watford's manuscript holders are superb for holding your paper at the ideal height and angle to allow you to read and type in ease and comfort.

Available in 2 full A4 versions, desk resting and shelf clamping. Paper is held firmly by means of a plastic retaining ruler and a clip grip. (for resting books or magazines, the desk top version is recommended).

Desk Top **£7** (carr. £3)

Angle poise **£12** (carr. £3)

NEW

Handy 2 Way Printer Switch

A handy two way compact printer switch that enables you to connect 2 Micros to 1 printer, or 2 printers to 1 Micro. Attaches easily to your printer, monitor, etc. A low cost solution for educational establishments. Ideal for those wishing to use a dot matrix and a laser printer. Available in two configurations.

Compact AB Switch Centronics	**£20**
Compact AB Switch RS232	**£19**

(Cables extra at £6 each)

MEGABUFFER 256

The Smallest 256K Printer Buffer Unit in the world **38mm x 130mm x 134mm**.

This new Megabuffer 256 from Watford is a full featured 256K Printer Buffer. The features are:

- ● Improves efficiency by making more efficient use of computer and printer.
- ● Compatible with any computer and printer that uses Centronics Parallel connections including all BBCs, IBM PCs, etc.
- ● Total compatibility with all software.
- ● Cheaper phone bills when using your Modems.
- ● Ideal for those doing large graphics screen dumps that are slow to print.
- ● Multi-Copy facility allows you to print several copies via Megabuffer without going through your computer.
- ● Data Dump facility is included.
- ● Built in test unit for both the buffer & your printer.

Only £149 (carr £5)

THE EPSON RX-FX-KAGA PRINTER COMMANDS REVEALED

So you bought yourself a new printer, because the salesman in the shop showed you how clever it is and impressed you with all sorts of printouts to show its capabilities – he may even have offered you a special price.

However, now that you have got it home and connected it to your BBC microcomputer, you are wondering how to make it perform these magical tasks. The manual seems to give no clues, and when you type in the example programs, the computer throws the LPRINT statements back in your face.

Now what do you do, when this £400 piece of high technology refuses even to move its head, and you have stayed up until 2 in the morning with copious supplies of coffee, desperately trying to print something out. Once again, Watford Electronics comes to your help with our new book entitled 'THE EPSON FX-KAGA PRINTER COMMANDS REVEALED'.

This book describes in plain, easy to understand English, how to use and make the most of your KP810, PW1080A or any other Epson FX80 compatible Printers like Panasonic KX-P1080/1, etc., with the BBC Micro, both from BASIC and Wordwise.

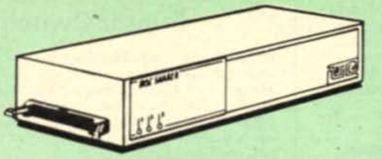
It describes in detail how to obtain the maximum in graphics capability from your printer and includes full indexes allowing you to cross index the numerous commands. Every command is explained in detail, with an accompanying BBC Basic program and an example of its use from Wordwise.

£5.95 (No VAT)

CREDIT CARD 24 HOUR
Ansaphone Hot Lines
(0923) 50234 or 33383

Continued →

DISC DRIVE SHARER



(Ideal for educational establishments)

At last, a low cost alternative to the Econet system. Watford's Intelligent Disc Drive Sharer allows you to connect 3 BBC micros (model B, B+ and Master series) to a single or double disc drive. Running under any DFS or DDFS, this intelligent unit will automatically queue the computers. Each computer has a status light dedicated to it. If it is green you will get immediate access to the disk, and red means that you are next in line. The unit plugs directly into the disc drive socket on each computer and is powered by the mains. (N.B. Not for use with ADFS.)

Launch Price: **£65** Price includes 3 Cables

NOW WITH EXTRA FEATURES AT NO EXTRA COST – Watford's latest DFS 1.44

- Incorporates Acorn's Official Tube Host Code so that those with 2nd processors no longer need to waste a ROM socket on the DNFS.
- Option to DOUBLE the speed of BPUT and BGET.

WATFORD's & ACORN's DFSs

Watford's popular and widely acclaimed DFS has now been available for six years and has gained a large following amongst serious and educational users of the BBC Micro. Owners of Acorn or any other standard DFS can upgrade to our "Ultimate" DFS merely by replacing their DFS ROM. See below for this upgrade. ***(P.S. Watford's highly sophisticated DFS is fully compatible with Acorn standard DFS). (while Acorn's 1770 DFS is fully compatible with Watford's Mk II DDFS)***

● *Watford's sophisticated DFS ROM only*	**£16**
● *We will exchange your existing DFS ROM for Watford's Ultimate DFS ROM for only*	**£12**
● *DFS Manual (Comprehensive)*	*(no VAT)* **£6.95**
● *DNFS ROM only* **£17**	● *ADFS ROM only* **£25**

(P.S. Our DFS manual is the only comprehensive Manual available for the BBC micro and covers both Acorn & Watford DFSs).

(The Single Density DFS system is now old technology. Like Acorn, Watford too have decided to replace it with their more up-to-date 1770 DDFS interface. We have informed most of the software houses of this decision in order that they can ensure compatibility with our highly sophisticated and fully Acorn compatible DDFS).

NEW

Watford's MkII 1770

Double Density DFS Interface

Many of our customers have wanted to use our superior DDFS and Acorn ADFS together. Now our Mk II DDFS Board with its 1770 Disc Controller, has been adapted to allow the use of Acorn ADFS as well. It also has all the commands of the Acorn's 1770 DFS, plus the added features:

Added features include:

- Acorn ADFS compatible – Use ADFS on our DDFS board.
- Tube host Code – No longer any need to have the DNFS in your machine to use Co-Processors, even the CoPro and Master 512.
- Auto 40-80 Track sensing – no need to fuss with 40/80 track switches (even works with protected disks).
- An extremely powerful 8271 emulation – ensuring compatibility with almost all software.
- New low profile – small footprint board.
- Fits with all third party ROM boards.
- Option to double the speed of file handling operations – BPUT and BGET.
- Operates in both single and double density modes.
- OSGBPB has been recoded, increasing still further the speed of file handling.

Please note that not all DDFS's are capable of providing either the full 80% storage increase or of allowing a file the full size of the disk – Ours allows both of these!

If you already have a DDFS (any manufacturer), and wish to upgrade to our MkII version, then simply return your existing ROM and DDFS board and we will supply the new DDFS for only **£30.00**.

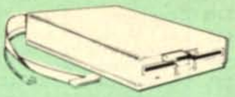
● Special introductory offer	**£39.00**
● DDFS Manual	(No VAT) **£6.95**
● We will exchange your existing DFS Kit for our sophisticated DDFS for only	**£25.00**

Please note, as the MkII DDFS is a hardware and software upgrade, it is not possible for existing Watford DDFS users to simply exchange their ROM for the new version.

DUST COVERS (For our Disc Drives)

Single CLS (without PSU) **£3.20** Twin CLD (without PSU) **£3.85**
Single CS (with PSU) **£3.95** Twin CD (with PSU) **£3.90**

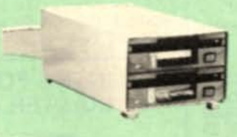
Special 40/80 Disc Drive/DDFS Mk II Offer



- The popular 40/80 track 400K single Disc Drive, Double Sided, cased with Cables. Plugs directly to your Micro.
- Watford's extremely popular DDFS Disc Interface (allows 720K storage). Will run in both, Single & Double Density modes.
- A comprehensive User Friendly Manual.

A Bargain at Only **£123** (£7 carr) (Offer valid while stocks last)

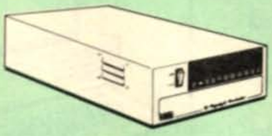
3½" DISC DRIVE OFFER



These top quality 3½" Double sided, 80 track, 1 Megabyte (unformatted each Disc Drives), are attractively finished in BBC beige. They are supplied complete with all cables and a Utilities Disc. They run directly from the BBC B/Master's own PSU.

● CLS35 400K Unit £69 ● CLD35 800K Unit £125

WATFORD's WINCHESTER DRIVES



Undoubtedly the best value for money Winchester Hard disc available anywhere for the BBC Micro.

This 30 Megabyte hard disc is completely compatible with the Acorn ADFS – that's why we have bundled it with each Winchester drive, along with a Utilities Disc.

Finished in rugged metal and fetching BBC beige, the Winchester has an internal fan, so quiet you won't even hear it! A switched mode power supply and a neon-lit on/off switch are there along with a light on the hard disc to tell you when it is working – just compare the price with our competitors' 20 or 28 Mbyte discs!

Compatible with the Master, and the BBc B (with 17 X disc interface).

● 30 Megabyte BBC Hard Disc **£405** (carr £9)

FLOPPY HEAD CLEANER KIT

The heads in floppy drives are precision made and very sensitive to dirt. The use of a cleaner Kit is a sensible precaution against losing valuable data. It is recommended to clean the drive head once a week. It is very simple to use. Available in 3½" & 5¼", please specify.

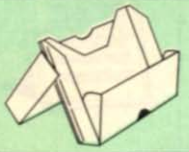
£4

ANTISTATIC LOCKABLE DISC STORAGE UNITS

Gives double protection – Strong plastic case that affords real protection to your discs. Antistatic helps avoid data corruption whilst in storage. The smoked top locks down. Dividers and adhesive title strips are supplied for efficient filing of discs.

● **M35** - holds upto 50 5¼" discs	**£4.95**
● **M85** – holds upto 95 5¼" discs	**£6.95**
● **M25*** – holds upto 25 3½" Discs	**£4.95**
● **M50** – holds 50 3½" Discs	**£6.50**
● **M10** – holds upto 10 Data Cartridges	**£15**

* Not lockable



PLASTIC LIBRARY CASES

Holds up to 10 5¼" Discs. **Only £2.00**

DISC PLONKER RACK

When using ones micro, there is a tendancy to have more than one Disc on the desk. This exposes them to the hazards of fingerprints, scratches, dust, coffee and an untidy desk.

Why not protect your valuable data from all these hazards with the help of our extremely handy and low cost DISC PLONKER RACK. Holds upto eight 5¼" discs.

Protection at Only: **£2**

DISC ALBUMS

Attractively finished in black leather look vinyl. Stores upto 20 Discs. Each disc can be seen through the clear view pocket.

£4

Quality Disc Drives from Watford

To help you decide which drive is the most suitable for your needs (and your pocket!), we have produced the table below.

The first capacity given in the first column indicates capacity in single density mode. That within the brackets is the capacity in double density mode. All disc drive type numbers start with the prefix "C".

The tinting on some of the boxes is used to indicate which Drives are 40 track (non-tinted) and which are 80 track (tinted). All our 80 track drives are already fitted with a 40-80 select switch.

***All our Disc Drives are Double Sided and will operate in both Single and Double Density modes.** Extensive experience of the usage of disc drives suggests that the JAPANESE drives currently represent about the best in terms of speed, reliability and overall "elegance" available for the BBC Micro.*

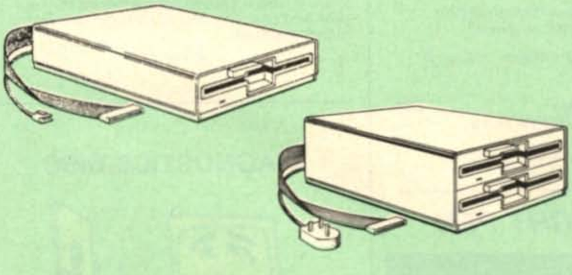
Various UK "manufacturers" of disc drives for the BBC micro (more accurately, "packages" label other manufacturers drives with their own name). We buy the high quality NEC and Mitsubishi drives in large quantities directly from the manufacturers, package them and sell them at "dealer" prices direct to the public.

If you look around the popular BBC micro press, you will find that the prices we quote for the top quality, new slimline disc drives are, virtually without exception, some of the best around. These prices, coupled with the backup of one of the country's largest distributors of BBC peripherals provides a superb deal.

Unless you anticipate using dual drives in a fully expanded BBC system for long periods of time with little ventilation, then we suggest that our range of "CL" disc drives without the PSU (Power Supply Unit) would be quite adequate (extensive tests within our workshops have confirmed this). All drives are supplied complete with a SPECIAL UTILITIES Disc, Cables and Plugs. The Drives with power supply have a mains moulded plug for safety purposes. Ideal for Schools & Colleges. We are now able to supply all single disc drives with Power Supply, in either single or dual case. (Dual case has a twin data cable and a power supply capable of driving two disc drives) allows easy expansion to a dual drive unit, at a later date. Prices stated in the pricing boxes below are for single drives in standard single cases. Single drives in a dual case cost an extra £10. (At Watford we anticipate your needs of tomorrow, not just today)!

When using a BBC Micro, most people find themselves short of desk space. The Watford's BBC Micro plinths form an ideal way of recovering some of this precious space) your BBC, Disc Drive and Monitor can all occupy the same vertical footprint and still be comfortably situated. With the Watford Double plinth, your Disc Drive is mounted vertically at one side, leaving a very valuable area directly in front of you for such useful items as spare discs, pen, paper, reference manuals, etc. Follow the trend with Watford plinth. (Turn to the 4th page of our advert for the Plintns).
P.S. All our 5¼" Disc Drives with PSU are compatible with the Compact Micro. All you require is the special Compact Disc Drive Cables designed by us.

Our Disc Drives conform to BS415



"Test Bureau Approved for Use in Education"

Capacity	Drives without P.S.U.		Drives with P.S.U.	
	Single	Twin	Single	Twin
400K (720K)	CLS400S £79	CLD 400 £168	CS 400S £89	CD400 £188
800K (1.44M)		CLD 800S £159		CD 800S £169

● TWIN Disc Drive Case, complete with Power Supply & Cables **£43**
Securicor carriage on Disc Drives £5 to £6

*Prefix **C** = Cased Drive*
***L** = Less PSU*
***S** = Single*
***D** = Double*

*Suffix **S** = 40-80 Switchable*

e.g. CLS400S = Cased Disc Drive, Less power supply unit, single 5¼" 400K, (720K in double density); Double sided; 40/80 track switchable.

Cable to connect 5¼" Disc Drives to BBC Compact
Single £9 Twin £12
Special Cable to connect both 3½" and 5¼" Disc Drives simultaneously to the BBC Compact £13

Mysteries of Disc Drives & DFS Revealed

Are you tired of faulty cassettes, and lengthy loading times? Do you want to upgrade your BBC micro to take discs but you get tied up in the plethora of jargon surrounding the choice and use of these systems.

Then The Mysteries of Disc Drives and DFS Revealed is the book for you. It explains in detail the different types of systems available, how they are installed and how to use them. Many examples are given including pre-written programs to call various functions of the DFS available only through Operating System calls. Different types of disc, 40/80 tracks etc. are all explained. This book is ideal for the beginner confused by the plethora of choice available in the marketplace.

£5.95 (Book No VAT)

3M – DISKETTES

3M – SCOTCH Diskettes with Lifetime warranty from Watford Electronics your 3M Appointed Distributor.

● *10 × 5.25" S/S D/D 40 Track Diskettes (744)*	***£6.00***
● *10 × 5.25" D/S D/D 40 Track Diskettes (745)*	***£7.00***
● *10 × 5.25" S/S D/D 80 Track Diskettes (746)*	***£11.50***
● *10 × 5.25" D/S D/D 80 Track Diskettes (747)*	***£11.00***
● *10 × 5.25" 1.6M D/S D/D High Density Discs for IBM XT and AT*	***£16***
● *10 × 3.5" S/S D/D 40/80 track Discs*	***£10.00***
● *10 × 3.5" D/S D/D 40/80 track Discs*	***£11.75***
● *10 × 3.5" High Density Diskettes*	***£25***

FREE Designer Watch OFFER

Purchase any 5 packs of the above 3M Diskettes from us during the months of May & June '89, and qualify for a FREE 3M's attractive Black Designer's watch.
(Offer subject to availability)

TOP QUALITY 3.5" & 5.25" DISKETTES

To complement our range of Quality Discs and Disc Drives, WE are now supplying SPECIAL OFFER packs of 10 Lifetime guaranteed discs. Each disc has a reinforced hub ring. Supplied complete with selfstick labels and a Plastic Library Disc Box.

● *10 × **M3** 3.5" D/S D/D 80 Track Discs*	***£10***
● *10 × **M9** 3.5" Double Side High Density*	***£25***
● *10 × **M4** 5.25" S/S D/D 40 Track Discs*	***£5***
● *10 × **M5** 5.25" D/S D/D 40 Track Discs*	***£7***
● *10 × **M7** 5.25" D/S D/D 80 Track Discs*	***£9***
● *10 × **M8** 5.25" D/S H/D Hi-Density Discs*	***£14***
● *3" Double Sided Discs*	***£2.50** each*

Special BULK OFFER on 5¼" DISCS

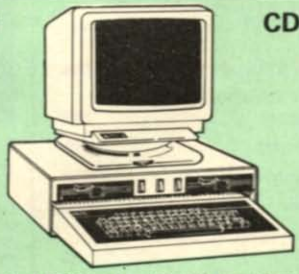
PRICES SLASHED

(Supplied packed in Anti-Static Lockable Storage Units)
(Lifetime warranty on Discs)

BULK PACK DISCS in lots of 100

Type	S-S 40T	D-S 40T	D-S 80T
● Without Sleeves	£35	£39	£45
● With Sleeves	£38	£42	£48

DP35-800S CDPM800S



Twin 800K Double sided 40-80 track switchable disc drives mounted in an attractively finished Beige colour plinth for the BBC Micro. Supplied complete with integral power supply, cables and Utilities disc. The mains switch with neon On/Off light indicator, and the two 40/80 track switches are mounted on the front panel for ease of use.

CDPM 800S for the BBC & Master £182
DP35-800 for BBC/Master £165
(For DP35-800S spec. see Page 2 of our advert)
(Securicor Carr. £7)

(The above drive units are 2 Megabytes unformatted)

Continued

QUEST MOUSE Mk II

The ultimate in Mouse technology, the Watford Electronics Quest Mouse must be the most powerful Mouse package yet produced for the BBC Micro. Featuring state of the art 32K ROM software the Quest Mouse package is filled with features essential to the budding artist. The Quest Mouse is a high precision, low profile and large footprint mouse. It has three large comfortable buttons and its RUBBER COATED STEEL BALL is smooth and easy to use on virtually any work surface. This also eliminates any directional bias that one encounters on the most well-known mouse for the BBC. The Quest Mouse is FULLY HARDWARE COMPATIBLE with the AMX MOUSE so that it will work with any of the AMX range of software.

The two parts of the Quest package are available separately so that existing Mouse owners can upgrade to the Watford's sophisticated Quest Paint software or replace their existing worn out mice for a minimum cost.

QUEST PAINT

The software is used to draw high resolution Mode 1 pictures in full colour. All menu selection and control of the drawing process is performed with the mouse so that you will hardly ever touch the keyboard.

SOFTWARE FEATURES

The software is far too powerful for us to describe it fully in such a small space. Below is a list of the various features. Please write to us for a fully descriptive leaflet.

Disk interface not required. Utilities disk has facility to create and print big screens. Colours applied can be solid, either pattern of user defined pattern. Drawing can use brush or airbrush. Brush shapes can be defined and stored. Airbrush sprays colour/pattern randomly with four jet sizes and even or center spread. Colour cycles. Colour protection to stop particular colours from being overwritten by selected drawing actions. All standard drawing facilities like: rubber, straight pencil lines, triangles, circles, ellipses, rectangles, parallelograms, polygons, etc are provided. All shapes can be solid or just a boundary line. Once a shape has been set up it can be repeated anywhere on the screen. Global colour replace in a rectangle. Powerful fill facility for areas and vertical/horizontal lines. Full cut and paste of rectangular areas with rotation and size with screens from Watford Beeb Video digitiser. Load and Save screens with colour pallet information, save brush and pattern definitions etc.

● Quest Mouse II & Quest Paint	£58
● Quest Mouse II, Quest Paint, AMX Stop Press & Pagefont	£89
● Quest Mouse II only	£26
● Quest Paint Software only	£34
● Quest Font Disc	£15
● Quest Mouse Mat (Red or Blue or Green please specify)	£3
● Part Exchange your unreliable AMX Mouse for a Quest Mouse for only	£22
● GXR ROM for the BBC Micro	£22

(P.S. Quest Paint is not compatible with BBC Compact)

N.B.
1. Quest Paint supplied complete with Software in a 32K ROM, Comprehensive User Guide and a Utility Disc.
2. Quest Font Disc has 22 text FONTS for use within Quest Mouse.

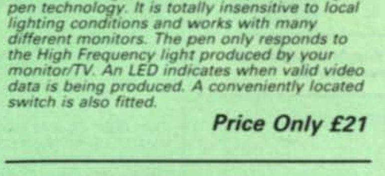
ConQuest

Watford's Quest package is an extremely powerful and flexible drawing package, with very wide and unusual features. However, since its launch various suggestions for even more advanced & powerful facilities were received from the Quest users. ConQuest allows you these more advanced facilities, like, distortion of a cutout to any shape and a full font designer. If you also have a GXR ROM in your machine or you are using a BBC Master then ConQuest will take advantage of this to give ellipses at any angle, sectors and arcs, etc. Quest combined with ConQuest and Acornsoft GXR ROM make up THE MOST POWERFUL drawing packages available for the BBC range. Quest Paint is able to take advantage of almost any additions to your machine, such as Shadow or Sideways RAM. ConQuest takes this principal even further, by utilising the otherwise normally incompatible Sideways RAM facility by holding pictures in them.
Some of the features are:

- *Pick filenames off the screen for loading and saving.*
- *Rotate a cutout to any angle and Distort it to any four sided shape.*
- *Has Built in Font editor.*
- *Default brushes and patterns on startup.*
- *16 x 16 font available on start up.*
- *Ability to reset patterns, fonts and brushes to default at any time.*
- *ROM based enhanced Epson and compatible printer dump.*
- *ROM based enhanced extended picture routine.*
- *Ability to create and abort extended pictures.*
- *Improved disk access speed for extended pictures.*
- *User definable sideways RAM driver for incompatible sideways RAM systems.*
- *Ellipses at any angle on Master 128 (or B with GXR ROM).*

ConQuest ROM Package **£30**
(Price includes software in ROM and a comprehensive Manual).
(Not Compatible with BBC Compact)

MARK II LIGHT PEN



Our Mark II Light Pen is the very latest in light pen technology. It is totally insensitive to local lighting conditions and works with many different monitors. The pen only responds to the High Frequency light produced by your monitor/TV. An LED indicates when valid video data is being produced. A conveniently located switch is also fitted.

Price Only £21

FLEET STREET EDITOR

Software pack for BBC Micro	£33
Software pack for the Master	£39
Software Pack for Compact	£40
Admin Xtra Disc Utility	£13
Walt Disney Disc Utility	£13
Fonts N Graphics Disc Utility	£13

RB2 Marconi
TRACKER BALL

RB2 (AMX/Quest compatible)	£45
RB2 including Quest Paint	£75

THE NEW Mk III AMX MOUSE

ONLY: £59 Inc. Super Art package
(carr £3)
(Please specify for BBC, Master or Compact)

MOUSE MAT	£3
AMX MOUSE ONLY	£29
AMX UTILITY Package	£13
AMX SUPERART Package	£34
AMX STOP PRESS – A Desktop publising software. Works with Keyboard, Joystick or a mouse	£32
PAGE-FONTS – Over 20 Fonts for use with AMX Pagemaker	**£13**
AMX DESIGN (ROM)	£55
AMX XAM Educational	£15
AMX EXTRA EXTRA	£16
AMX MAX A gem of desktop (ROM)	£15

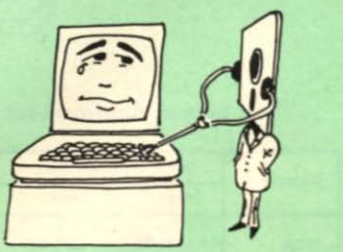
NEW

WE MOUSE HOUSE

Treat your mouse to a cosy Mouse House. This handy little gadget solves the problem of where to store your mouse when it is having a rest. Made of sturdy plastic, the WE Mouse House attaches to the side of your computer, Monitor, disc drive or desk.
It protects it from damage when not in use, yet within easy reach when you need it again. There is also a second compartment for your pens and pencils – and at £4 it doesn't cost a rodent's ransom.

Price £4

DIAGNOSTICS DISC



The BBC Micro is a very complex machine and thus diagnosing a fault can be very difficult. At Watford Electronics, we realise how difficult it can be when faced with a problem, finding yourself a long way from your nearest dealer, or even just uncertain about your Beeb's health, but not wanting to waste time and money taking it to be looked at.
The solution to these problems is here now, in the form of the Watford's Diagnostics Disc. This excellent utility is specially designed to test out the following areas of your Beeb:
RAMs, ROMs, ULAs, Sound, Keyboard, Disc, RS423, ADC, User Port, Printer Port, Cassette, Joysticks, Speech, Disc Drives, 6502 and Z80 2nd Processors.
This utility is an invaluable aid for all those who take the reliability of their system seriously. A comprehensive manual provides full operating details and a list of possible causes and remedies for any faults that you may find along the way. The package also enables a permanent equipment and service record to be maintained.

Only £20.00

BEEB
VIDEO DIGITISER

"Test Bureau Approved for Use in Education"

Using any source of composite video (colour or monochrome) and the Watford Beeb Video Digitiser, you can convert an image from your camera into a graphics screen on the BBC Micro.

This uses the full graphics capacity of the BBC micro in modes 0, 1 or 2. The video source may be a camera, video recorder or television, and is connected via the video output socket.

Images produced can be compressed, stored to disc, printed on an Epson compatible printer, directly used to generate graphics, analysed for scientific and educational use or converted to other formats e.g. Slow Scan TV or receiving a picture from a remote camera using a modem.

The output from the digitiser exactly matches the graphics capability in each mode, with up to 8 levels of grey in mode 2. The unit connects into the User Port and automatically scans a complete picture in 1.6 seconds.

Both the black and white levels can be adjusted manually for the optimum picture, or switched to automatic for unattended use. The image produced can be reversed if necessary.

Full controlling software is supplied on a normal sideways ROM and this is easily accessed via additional * commands. The package i designed to allow easy input of complex screens and give full access of the data to the user. Once on the screen, the image can be used as a normal graphics screen, allowing any of the usual graphics commands in BASIC or other ROMs to work on it.

A special print dump routine is included with the driver programs. This is specially designed to produce a fast, correctly proportioned picture, with reduced "contouring", resulting in an accurate reproduction of the original image.

Detailed examples of driving this unit from BASIC or other languages are all provided in the extensive manual supplied.

£109 (Carr. £5)

(Price includes) Digitiser Unit, Software in ROM & a Comprehensive Manual)
(BBC B+ and Master compatible, except Master with Econet)

Magazine Maker

(As seen on TV)

A combination of the Pagemaker and Watford's Beeb Video Digitiser.

Using any video that provides a composite signal and the digitiser, images from a camera or TV can be converted into a graphics screen on the BBC Micro.

They can then be used within Stop Press to illustrate magazines or newsletters – in fact anything that needs to be created on A4 size paper.

With Stop Press's many features, a variety of pictures can be composed – the only limit being the imagination.

Pictures can be doctored using Stop Press's graphics option to produce any number of effects.

Text can be formatted around the digitised photo on screen using the facilities available, which include 16 typefaces, character and pattern definer, text formatting and the ability to load in wordwise and viewfiles plus much more.

Once created the picture can be printed out. The Magazine Maker is suitable for any use that requires illustrated documents.

Complete Package **£135.00** (carr. £3)

WAPPING EDITOR
"MIGHTIER THAN THE QUILL"

Watford Electronics bring professional quality Desktop Publishing to the Beeb. The Wapping Editor is a totally self contained mouse-driven desktop publishing package designed to run on the BBC B, B+ and Master computers. The massive 64K Rom contains ALL the software you need to do your own publishing. It 'Brings the Freedom of Press' to your fingertip. The software has a word processor, a graphics package, a page layout section and a font designer. Although very sophisticated, Wapping Editor is simplicity itself to use. Anyone already familiar with Quest Paint will immediately feel at home.

GRAPHICS PACKAGE

Imagine Quest Paint re-written to take advantage of the high resolution of Mode 0, well this is it. The Wapping Editor could well be worth buying for this facility alone. This must surely be the graphics.

WORD PROCESSOR

This section is a fully functional word processor specially tailored to suit the Desktop Publishing environment. Gone are all the unnecessary and cumbersome text formatting commands – these are dealt with in the 'Page-Layout' section. The features of this word processor include wordwrap, wordcount, insert/overwrite, move block, copy block, delete block, search and replace, browse, etc, many of these features being mouse controlled. Text input can of course be taken from existing word processor files like Wordwise, View, etc, but it is not necessary to have a separate word processor in order to use this package.

PAGE-LAYOUT SECTION

Page Layout becomes easy using these mouse-driven routines. The user simply 'pulls' a rectangle onto the page and states which text document or graphic is required to fill the space – it's as simple as that! Text can be automatically printed in a pre-set number of columns, left justified and/or right justified, or centered. Several different typefaces can be held in memory at one time. Graphics may be stretched, squahsed or cropped to fit any size rectangle. Graphics input can be from the software provided in the package or, using the 'mode convert', from any graphics mode screen.

THE FONT EDITOR

This is an enhanced version of the font editor contained in the Con-Quest ROM and allows the editing of ALL 95 characters. As well as being able to design your own typefaces, fonts from other DTP packages or from Quest Pain may be loaded into the editor and converted for use with the Wapping Editor. This sophisticated editor has numerous functions including slide, flip, invert and rotate individual characters or the whole font. Individual characters can be mirrored or copied and a mask feature allows you to superimpose two characters. Lines and columns can be inserted or deleted allowing the character to be stretched or squashed. This font editor will also allow 'font' and 'brush' files to be designed for use with Quest Paint.
This package is the latest in the line of integrated professional quality mouse-driven software from Watford Electronics, the company that adds power to Beeb.

Wapping Editor	Launch Offer: **£69**
Wapping Editor with Quest Mouse	**£89**

DUMPOUT 3

A highly sophisticated screen dump ROM. This has to be the most flexible and powerful screen dump ROM yet produced for the BBC micro. It will put on paper anything you see on the screen, including full Mode 7 graphics.
Also provided are window setting utilities and OSWORD calls to plot and read Mode 7 graphics pixels.

Facilities:

- Vertical and horizontal scaling in all graphics modes and mode 7
- Rotation of image by 90, 180 or 270 degrees
- Left hand margin setting
- Screen dump window setting
- Colours appear as grey scale
- Two tone fast dump
- Colour mask
- Mode 7 contrast expansion
- Mode 7 contiguous dump

For use with the following printers:

GLP, GP80/100/250, CANNON, STAR, KAGA/TAXAN, NEC, SHINWA CP80, GEMINI, EPSON MX/RX/FX, M1009, NEC PC8023, DMP100/200/400, Panasonic KX1081/82, Mannesman Tally and compatibles.

Only: £25

OFFICE MASTER

CASHBOOK – A complete "Stand Alone" accounting software package for the cash based sole trader/partnership business. It is designed to replace your existing cashbook system and will provide you with a computerised system complete to trail balance.

FINAL ACCOUNTS – Will take data prepared by the Cashbook module and produce a complete set of accounts as following: Trial Balance with inbuilt rounding routine; Notes to the accounts; VAT Summary; Profit & Loss A/C; Balance Sheet.

MAILIST – A very versatile program. Enables you to keep records of names and addresses and then print, examine, sort and find them, all with special selection techniques.

EASILEDGER – A management aid software tool designed to run alongside an existing accounting system. Essentially a Debit/Credit ledger system which can handle sales, purchase and nominal ledger routines to provide instant management information.

INVOICES & STATEMENTS – Greatly reduces the time and cost of preparing Invoices and Statements by storing essential information like customer names, addresses and account numbers. Has VAT routines and footer messages facility.

STOCK CONTROL – Allows you to enter stock received, stock out, summary of stock items and current holdings together with details of total cost, total stock to minimum level, units in stock ordering, quantity and supplier detail.

All this for only **£21** (Disc)

OFFICE MATE

- DATABASE
- BEEBCALC SPREADSHEET
- BEEBPLOT GRAPHICS

DATABASE – Set up a computerised card index system with powerful search facilities.

SPREADSHEET – Offers many calculation and editing features.

BEEBPLOT – Provides visual representation from Spreadsheet data.

OFFICE MATE Only £10 (Disc)

Continued →

ARIES CORNER

B-32 Shadow RAM Card

Like the BBC B+, the B32 provides 20k of shadow screen RAM and 12k of sideways RAM. Unlike the B+, the B32 has simple software commands which allow the user to reconfigure the RAM as 16k of shadow RAM and 16k of sideways RAM, or all 32k as sideways RAM.

With the B32, the programmer gets up to 28k of RAM available for Basic, Logo, Comal, Forth, Lisp and BCPL programs in any screen mode. The business user gets extra memory for View, ViewSheet, Wordwise Plus, Interword and many other applications. For advanced applications, the scientific user gets access to a massive 47k of data storage using the Acorn approved *FX call.

Sideways RAM enables you to load sideways ROM images from disc, allowing you to have a large library of sideways ROMs (subject to the copyright holder's permission) stored on disc. The B32's sideways RAM can also be used to extend any operating system buffer (such as the printer buffer) or to load tape programs into a disc system.

The B32 simply plugs into the 6502 processor socket on your BBC micro – no flying leads to connect and no soldering. Provision of the on-board ROM socket means that the Aries-B32 control ROM does not use up one of your existing ROM sockets.

- Recommended by Computer Concepts for use with their Inter series of ROMs.

Price: **£80** (carr. £2)

Aries B-12 Sideways ROM Board

This board is extremely well made, simple to install, reliable when fully loaded and compatible with the Aries-B20 and the Aries-B32

The B12 provides a total of twelve sideways ROM sockets (the four in the original machine are replaced by the twelve on the board), all fully accessible by the MOS sideways ROM system. In addition, there are two sockets for sideways RAM, giving up to 16k of RAM using 6264 static RAM chips.

The B12 system consists of two parts: a large detachable "mother board" which carries the extension ROM sockets and a small "base board" on a short ribbon cable, which plugs into the existing sideways ROM sockets. This two-board design eliminates the reliability problems previously associated with some other ribbon-cable based systems.

If you do not have a B32 or B20, a small adaptor module (the Aries-B12C) is available at a nominal cost.

Price:		
	Aries B-12	£40
	Aries B-12C	£5

CREDIT CARD 24 HOUR
Ansaphone Hot Lines
(0923) 50234 or 33383

ARIES B-488 IEEE-488 INTERFACE UNIT

The Aries-B488 is an interface unit to enable the BBC micro to control and monitor IEEE-488 bus systems. The IEEE-488 bus (also known as the 'GPIB' or 'HP-IB') is the standard method of interconnecting programmable laboratory instruments and control equipment. Using the B488, up to 15 devices may be connected in a single high-speed data network.

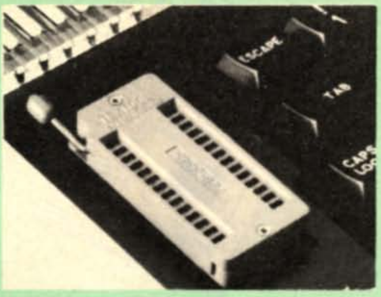
£238 (Carr £3)

EXTERNAL ROM BOARD for BBC MASTER

This external Beige finished, free standing cased unit with its own Power Supply allows you to plug-in upto 12 ROMs and 16K Sideways RAM.

Only £78

SIDEWAYS ZIF SOCKET



Allows you to change your ROMs quickly and efficiently, without opening the lid. The ZERO INSERTION FORCE (ZIF) socket is located into the ROM Cartridge's position.

- Very simple to install. NO SOLDERING required. The ZIF (Zero Insertion Force) eliminates the possibility of damage to your ROM pins when inserting & extracting.
- The low profile of the socket allows unrestricted access to the Keyboard.
- All data and address lines are correctly terminated to ensure correct operation of suitable ROMs with the BBC micro. We also supply a purpose designed see-through storage container with anti-static lining, allowing you to store up to 12 ROMs, protecting them from mechanical and static damage.
- This versatile hardware solves the problem of running out of socket space. Simply lift the ROM from the ZIF & insert a different one (No pulling or pushing of Cartridges. It is a must for all professionals and Hobbyists alike.)
- BBC, B+ and Master compatible.

ONLY **£18** (carr £3)

Low Profile CARTRIDGE SYSTEM

Complete System consists of: Low profile ROM Cartridge, Socket housing, Cable assembly, 5 labels and a library storage rack for the BBC B.

● Complete System	£11
● Spare Cartridges	£2.50
● Spare Rack	£1.50

ROM Cartridges for the BBC Master
Twin **£8**; Quad **£12**

16K DISC RAM

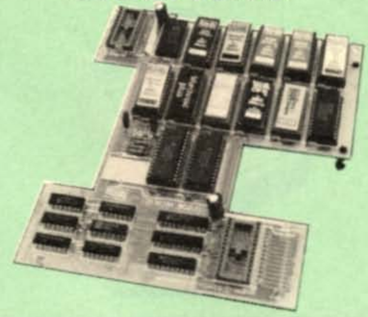
Complete with such features as read and write protection, these new modules from Watford Electronics are ideal for the hobbyist, software developer and ROM collector.
Key points to note about this new addition to the Watford range of products are:

- Write protection (useful in a variety of circumstances).
- Compact construction.
- Supplied complete with Battery Backup.
- No overheating or overloading problems.
- Free utilities disc supplied.
- Can be used as a 16K PRINTER BUFFER.
- Ideal for professional software development.
- Supplied with utilities software disc.

Only: **£35** (carr £2)

P.S. 16K Disc Ram Board is not designed to work in conjunction with a Sideways ROM Board.

SOLDERLESS SIDEWAYS ROM SOCKET BOARD



In the May 1986 Micro User's independent review, the writer concludes, "The board has been well laid out. Its position is much better than others – not over the HOT RAM chips and further away from the disc controller area". "I give the solderless ROM board the thumbs up and wish it success".

This brand new board from Watford Electronics is designed specifically for those wishing to add a ROM board to their own BBC without the need to perform any soldering.

This new board expands the total possible number of ROMs in a BBC from 4 to 16.

Unlike our competitors inferior boards, the ONLY upgrade required for fitting battery backup to the Watford Solderless ROM board (all Watford ROM boards, actually) is the fitting of the battery itself. (No other expensive components are required.)

- The key features of this new, no fuss, easy to install quality product from BBC leaders Watford Electronics are as follows:
- Increase your BBCs capacity for ROMs from 4 to 16.
- **No soldering required.**
- Very low power consumption.
- Minimal space required.
- Compatible with Torch, DDFS, RAM Card, 2nd Processor, etc.
- Socket 14 takes two 6264 RAM chips.
- Read protect to make RAM "Vanish") allows recovery from ROM crashes.
- Battery backup option for RAM chips.
- Supplied ready to fit with comprehensive instructions.

Price: Only £35
Battery backup fitted **£39**
Battery Backup only **£3**
(carriage £2)

- Sideways RAM Utilities Disc for Solderless ROM Board. Includes the options to load and save ROM Images and the facility to use Sideways RAM as Printer Buffer.

Only: £8

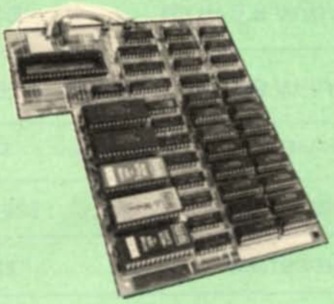
USER PORT SPLITTER UNIT

User Port Splitter
A
B

Gone are the days when you had to plug and unplug devices from the User Port. This extremely useful little device allows two units to be connected to the User Port simultaniously, and select between them simply by toggling a switch. This device is particularly useful for those people using Quest Mouse and the Watford Video Digitiser or any similar combination.

Excellent Value at **£22** (carr £2)

ROM/RAM CARD



Watford Electronics announced the first ever commercial ROM board for the BBC micro, the Watford Electronics 13 ROM Socket Board 3 years ago. Following the success of this board, we have designed what probably represents the ultimate in expansion boards, the new Watford Electronics ROM/RAM board. This highly versatile and sophisticated board represents the latest in "2nd generation" sideways ROM technology for the BBC micro, designed to satisfy the serious BBC user.

- NO SOLDERING required to fit the board.
- NO overheating problems.
- No User Port corruption (avoids problems with the mouse, modems, Eprom Programmers, etc.)
- Fully buffered for peace of mind.
- Firm mounting in BBC micro.
- Compatible with all BBC micros (not BBC+ or Master).
- Total number of ROMs increased from 4 to 8.
- Up to 8 banks of sideways RAM (dynamic).
- Option for 16k of Battery backed CMOS RAM (CMOS RAM needs one ROM socket).
- Software Write protect for ALL RAM.
- Read protect for CMOS RAM (ALLEVIATES crashes during ROM development).
- Separate RAM write register (&FF30 to &FF3F).
- Automatic write to currently selected RAM socket for convenience.
- Accepts any ROM.
- FREE utilities disc packed with software.
- Compatible with our DDFS board, 32k RAM Card, Delta Card, sideways ZIF, etc.
- Large printer buffer.
- UNIQUE Fully implemented RAM FILING SYSTEM (similar to the popular Watford DFS).
- ROM to RAM load and save facilities.

The SFS (Silicon Filing System) can utilise up to the full 128k of RAM (with the SFS in any paged RAM) as a SILICON DISC. This behaves as a disc drive, with all the normal Watford DFS features (including OSWORD &7F for ROM-SPELL, etc.) to provide an environment that looks like a disc but loads and saves MUCH faster.

The ROM-RAM Board plugs into the 6502 CPU socket. This leaves free all the existing ROM sockets, which can still be used normally.

Any ROM that can be plugged into the BBC micro's own ROM sockets may be used in the ROM-RAM Board.

The ROM-RAM Board is supplied with all ordered options fitted as standard. Upgrade kits (with full instructions) are available for all of the options, for later.

Please write in for further details.

INTRODUCTORY PRICES:

● ROM/RAM card with 32k dynamic RAM	***£48***
● ROM/RAM card with 64k dynamic RAM	***£65***
● ROM/RAM card with a massive 128k dynamic RAM	**£109**

(carriage on ROM-RAM Card £3)

OPTIONAL EXTRAS:

● 16k plug-in Static RAM kit	**£17**
● 16k Dynamic RAM for Upgrade	**£17.50**
● Battery backup	**£3**
● Read and Write protect switches	**£2** each
Complete ROM-RAM board All options installed	**£115**

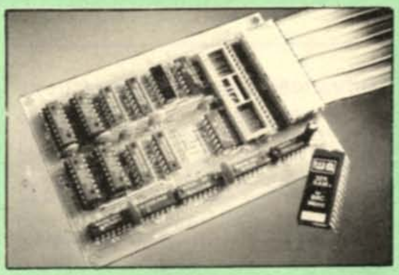
P.S.

Is your existing ROM Board overflowing with ROMs? Do you need more Sideways RAM? Is your Board unreliable? Then upgrade to Watford ROM/RAM Board and pay £5 less

32K

SHADOW RAM-Printer Buffer

Expansion Board



A MUST FOR WORD PROCESSING

Watford Electronics now brings you the latest state-of-the-art MEMORY EXPANSION BOARD for your BBC microcomputer. Don't throw away your BBC B for a BBC B Plus or BBC Master. Just plug the ribbon cable into the 6502 processor socket, and fit the compact board inside the computer. Immediately you will gain not 16K or even 20K, but a massive 32K of extra RAM!!!

- IMPROVE your WORD PROCESSING system, whether disc or cassette based. Don't wait for a slow printer – type in text while printing. TWO JOBS DONE SIMULTANEOUSLY and £100+ saved on a printer buffer.

- "VIEW" Wordprocessor users can now type in letters in 80 columns and have up to 28,000 bytes free – 5 times as much as normal.

- In WORDWISE (or WORDWISE-PLUS), preview in 80 columns with the full 24K of text in memory. This product is recommended as an ideal complement by Computer Concepts.

- Combine GOOD GRAPHICS and LONG PROGRAMS. Use the top 20K of the expansion RAM as the screen display memory, leaving all the standard BBC RAM free for programs. Benefit from MODE 0/1/2 graphics and 28K of program space.

- Use the FULL 32K or the bottom 12K of the expansion RAM as a PRINTER buffer for PARALLEL or SERIAL printers, sound channels, RS423 etc. Print large text files while running long graphics programs, and have all your buffer options available as well (*FX15,21,138,145,ADVAL etc). Please note only a 12K printer buffer can be used with Wordwise or Wordwise-Plus, due to the way they are written.

- Unique facility to turn ROMs off and on again. Unlike all other ROM managers, this feature does not use 'unofficial' memory. Two bytes of normally user-inaccessible memory on the RAM card are used to ensure ROMs are disabled WHERE OTHER ROMS FAIL.

- Recommended by Computer Concepts for use with their Inter series of ROMs.

Only £59 (carr £2)

(Price includes a comprehensive manual and the ROM)

INCREDIBLE WORDPROCESSING DEAL

Watford's 32K SHADOW RAM CARD and Computer Concept's INTERWORD Wordprocessor package.

at Only **£89** (carr £2)

BBC SOFTWARE'S Popular Educational Software

● Maths with a Story 1 (Disc). 4 primary level maths programs	**£11.25**
● Maths with a Story 2 (Disc) 4 further maths programs	**£11.25**
● Picture Craft (Disc) 6 - 14 age group. Pack consists of flexible geometrical design & colouring programs	**£17**
● WAVES: Science Topics (Disc) CSC O Level Physics program.	**£14.95**
● RELATIONSHIP: Science (Disc) O Level Biology program.	**£20.00**
● BONDING: Science (Disc) O Level Chemistry program.	**£20.00**
● ELECTROMAGNETIC SPECTRUM (8 Discs) O Level program.	**£20.00**
● ELECTRONICS IN ACTION (Disc) O Level program	**£19.95**
● NEWTON & THE SPACE SHUTTLE (Disc) O Level program.	**£20**
● ECOLOGY (Disc) O Level program.	**£20**
● POLYMERS (Disc) O Level program.	**£20**
● Clasification & Periodic Table O Level. The suite is supplied with its own database of chemical elements which can be classified according to your own rule.	**£20**
● FOOD & POPULATION (Disc) O Level program.	**£20**
● MICROTECHNOLOGY (Cassette) O Level program.	**£11.25**
● A VOUS LA FRANCE (2 Cassettes) A French language home study aid.	**£21.70**
● DEUTSCH DIREKT! (Disc & Audio Cassette)	**£19.95**
● Modem Master (Disc)	**£11.25**
● ADVANCED TELETEXT SYSTEM	**£8.65**
● PERIOD TABLE SOFTWARE	**£20**
● Astronomy – Primary (Disc)	**£12**
● Computers at Work – Primary	**£17.35**
● Introducing Geography – Primary	**£17**
● **Introducing Geography 11-17yrs**	**£17.50**
● Electric Fields 6-14 years	**£11.25**
● BlackQueen Contract Bridge	**£13**
● Espana Viva – 3 Discs	**£19.95**
● A Vous La France Disc	**£21.50**

APOLLO

The NEW Modem from Watford

Following numerous requests from you, our discerning customers for an APPROVED, Low Cost & High Performance modem with Auto Dial & Auto Answer facilities as standard) we bring you the versatile APOLLO Modem. Just compare the features and look at the price (which incidentally includes the cost of the Software, manual and BBC connecting cable). We are sure you will agree that Watford Electronics in their traditional way are giving you a super 'value for money' deal.

Just look at these features:

- V21 for Bulletin boards, Microlink, Telecom Gold, etc.
- V23 for Prestel, Home Banking, and other Viewdata services.
- Reverse V23 allows User run Viewdata service.
- 1200-1200 half duplex for communications.
- XMODEM, HEX and ASCII file transmission.
- Auto Dial of given 'phone number.
- Auto Answer for User's Bulletin Board.
- 80 column terminal with split screen facility.
- Prestel text screen dump.
- Fully BABT approved.
- **FREE Registration to MicroLink.**
- **£6.50 off annual Membership to Micronet, Prestel and Telecom Gold.**

Sale Offer: **£64** **(Carr £5)**

Price includes, the Modem, Comm Software Cables & Operating Manual).

(Write in for full specification)

Continued →

COMPUTER CONCEPT'S ROMS

ACCELERATOR	£30
CARETAKER Basic Utility	£23
DISC DOCTOR	£28
Graphics ROM	£29
TERMI	£25
COMMUNICATOR	£49
Printmaster	£24

Wordwise £26

Wordwise plus £40

We are giving away absolutely **FREE**, the superb Word-Aid ROM worth £24, with every WORDWISE PLUS package bought from us.

Word-Aid

The most comprehensive utilities ROM for Wordwise-Plus

Extend the power of your Wordwise Plus word processor with this most advanced ROM from Watford. By utilising the powerful Wordwise Plus programming language, WordAid provides a whole host of extra features, all accessed via a special new menu option. This ROM has been personally approved by Mr Charles Moir, the author of WORDWISE PLUS.

- Alphabetical sorting of names and addresses.
- Text transfer options.
- Chapter marker.
- Epson printer codes function key option.
- Search and display in preview mode.
- Embedded command removal.
- Print Multiple copies of a document.
- Multiple file options for print and preview.
- Address finder.
- Label printer.
- Mail-merger.
- Number/delete/renumber.
- Clear text-segment area.
- BBC B, B+ and Master compatible.

Only **£24**

(N.B. Word Aid requires a Disc Interface in your Micro)

HI-WORDWISE-PLUS DISC: £5

SPELL MASTER £42

Inter SHEET ONLY £37

INTER CHART ONLY: £25

Inter-WORD £36

MEGA-3 ROM

Interword, Intersheet & Interchart – 3 in one ROM £76

INTERBASE £49

All Prices Exclusive of VAT

MINI OFFICE II

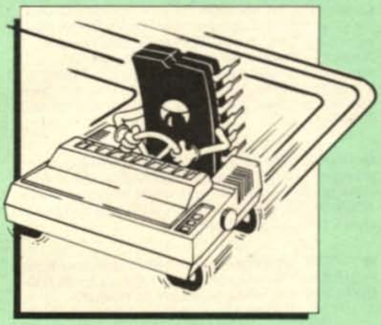
DISC Version for BBC B & B+	£14.00
DISC Version for BBC Master	£16.50
Disc Version for the Compact	£18.00

(When ordering please specify for which Micro & 40 or 80 track Disc).

Advanced Computer Products

Advanced Disc Toolkit	£30
Advanced Disc Investigator	£25
Advanced 1770 DFS BBC	£29
Advanced 1770 DFS Master	£30
Advanced File Manager	£25.00
Advanced Control Panel	£30.00

VIEW PRINTER DRIVER ROM



View is a powerful word processor, but until now has seriously lacked in terms of printer support. With the launch of our Printer Driver ROM, which includes an extremely powerful and easy to use Printer Driver Generator, View users can find themselves in the realms of advanced word processing only at a small outlay.

The VPD extends View's printer command with a series of mnemonic commands. All standard highlight sequences are also supported. A large range of printers are supported by drivers contained within the ROM (the drivers can be downloaded and customised). Printers supported include: Epson's MX, RX, FX, FX, LX, JX80 range, HI80, KP810/910, PW1080, JP101, HR15, M1009, GLP, Panasonic KX-P1081/2, JUKI 6100, etc.

Other printers are readily supported by defining a Printer Driver using the built in Printer Driver Generator. The features mentioned below are available to both the built in Printer Drivers and user defined drivers (assuming the printer supports the features).

NLQ control, Underline, Bold, Proportional Spacing, Microspacing, Italic, Superscript, Subscript, Condensed, Enlarged, Double Strike, Set lines per inch numerically (e.g. LPI 6), Set characters per inch numerically (e.g. CPI 5), Select printer font, Select printer ribbon colour, Translation sequences, Emulation of BBC Character Set, Simple numeric expressions for certain operations, Full printer setup, Send control codes, Print prompt on screen, Redefinable Pad character, Pause for key press, Prompt to change daisywheel, and Execute * command when printing.

Other features include a very powerful on screen preview, with bold, italic, underline, super/subscript, enlarged highlights, and a special printer driver to allow memory based text to be previewed by View 1.4. Of course, View 1.4, 2.1 and 3.0 are all supported, as is Shadow RAM and 6502 Second Processors. The BBC B series and Master series of micros are supported. A comprehensive manual is supplied. All in all, a very professional product for the discerning user who wants power at their finger tips. (Write in for a detailed leaflet).

Price: Only £33

VIEW

VIEW WORDPROCESSOR 2.1	£35
VIEW 3.0 ROM	**£48**
VIEW PROFESSIONAL	**£59**
HI-VIEW (for 6502 2nd Processor)	£36
VIEWSHEET (Acornsoft)	£36
VIEWSTORE	£36
VIEWSPELL-with 80 track disc	£29
VIEWPLOT Disc (Please specify for Master 128 or Compact)	£20
VIEW-INDEX	£12
OVERVIEW Packs 1 & 2	£69

Watford's own Sophisticated VIEW PRINTER DRIVERS

Epson FX80 & Kaga KP (Disc)	£8
Juki & Brother HR15 (Disc)	£8
Silver Reed Printers (Disc)	£8

THE COMPLETE BBC COMPUTER USER HANDBOOK

"Why has no-one written a book like this before? It's long overdue".

If you own a BBC-B, BBC B+, Electron, Master 128, Master Compact or Archimedes then this book is for you. It shows you how to get the most from your computer, and how to make the computer work for you. Although some sections are machine specific, most of the information, programs, hints and good solid experience are for the whole range of BBC machines. The general style and level means that both beginner and expert will feel satisfied with the quality and quantity of the material.

GENERAL – Uses and abuses of computers.

HARDWARE – How to design your own work station. Hardware additions (disc drives, ROMs, printers, 2nd processors, etc). DIY alterations.

HARDWARE RUNNING BBC-BASIC – All BBC machines are described with their differences. Compatibility between the various BBC machines. Networks. The Archimedes and its advantages.

GETTING ORGANISED – so that you keep track of your programs and control of your software. Setting up for easier programming sessions.

NEAT PROGRAMMING – Good style. Writing structured programs. Getting the best from BBC-BASIC, Graphics and screen displays. Speeding up programs. Saving space.

GENERAL PROGRAMMING TIPS AND HINTS – with a multitude of examples (eg input vetting, dealing with dates, blanking out function key messages, error trapping, disabling ESCAPE and BREAK, use of EOR with colour, etc).

DEBUGGING – Specific errors and how to handle them. How to test programs fully.

STANDARD PROGRAMS – Assessing word-processors, spread-sheets, databases, graphics packages, communications etc. How to customise them to your own requirements.

COMPUTERS AT HOME AND IN THE OFFICE – Introducing the computer to the office. Program protection. Computers and the law. Communications. Selling your own programs. 28 FULL CHAPTERS, elegantly written and extensively indexed. To dip into, consult, or read from cover to cover, again... and again... and again... **£14.95** (Book No VAT)

BOOKS (No VAT on Books)

15 Hr Wordprocessing BBC/View	£5.95
15 Hr Wordprocessing BBC/WW & WW+	£5.95
30 Hour BASIC (BBC Micro)	£12.95
6502 Assembly Language Programming	£19.95
6502 Application	£13.95
6502 Development Package	£7.50
6502 Programming the	£16.95
6502 Reference Guide	£10.95
68000 Assembly Language	£15.95
68000 Assembly Language Prog.	£10.95
68000 Assembly Language Techniques	£24.95
68000 Machine Code Programming	£13.00
68000 Microprocessor Handbook	£14.95
68000 Programming the	£22.95
68000 User Guide	£8.95
6809, Programming the	£18.95
Adv. Sideways RAM User Guide	£9.95
Advanced User Guide for BBC	£10.95
Amiga Hardware Ref Manual	£23.70
Amiga Machine Lang. Guide	£19.95
Art of Microcomputer Graphics	£16.95
Assembly Language Prog. for the BBC	£10.95
AY-3-8910 Programmable Sound Generator Data Manual	£3
BASIC 2–User Guide	£2
BBC–Advanced Graphics with the	£11.75
BBC – Advanced Programming Techniques for	£8.95
BBC–Mastering Assembly Code	£8.95
BBC Micro & the small Business	£5.75
BBC Micro–File Handling On	£8.50
BBC Micro–within the	£13.95
BBC Master 128 for High Flyer	£10.95
BCPL User Guide	£14
BCPL The Language & its Compiler	£8.50
C Big Red Book of	£7.50
C-A Dabhand Guide to	£14.95
C for Programmers	£9.95
C Programming Lang.	£23.95
COMAL–Introduction to	£9.50
Complete FORTH	£6.95
Computer Graphics & CAD fundamentals	£9.95
Deutsch Direkti (Book only)	£5.95
DNFS Instruction Booklet	£2
DISC FILING SYSTEM (DFS) Operating Manual for BBC	£6.95
File Handling on BBC Micro	£8.50
FORTH–Advanced	£9.95
FORTH on the BBC Micro	£9.95
Hackers Handbook - New	£6.95
Hitch-Hikers Guide to A.I.	£8.95
Interfacing and Robotics	£15.95
Introduction to COMAL	£9.50
Inside Information, Computers & Coms.	£9.95
ISO-PASCAL Reference Manual	£9.95
LISP the Language of Artificial Intelligence	£13.95
Logo on the BBC Micro	£7.50
Mysteries of DISC DRIVES and DFS REVEALED	**£5.95**
Mastering Assembly Code	£8.95
Mastering CP-M	£17.95
Mastering Interpreters & Compilers	£14.95
Mastering Music	£6.95
Mastering the Disc Drive	£7.95
Master Operating System	£12.95
Master Reference Manual Part 1	£14.00
Master Reference Manual Part 2	£14.00
Master Reference Manual–Advanced	£19
Mathematical Prog. in BBC Basic	£7.95
MINI OFFICE II–A Dabhand Guide	£9.95
PASCAL–Introduction to	£17.95
PASCAL Programming	£9.45
Practical Disc File Techniques	£5.95
The Epson FX-KAGA PRINTER Commands REVEALED	**£5.95**
The Software Business	£5.50
Towers Int. Transistor Selectors	£14.95
Understanding Interword – A Beginners Guide	£6.50
Using DOS+ on the 1512 (95% Ok for 512 Bd)	£9.95
View 3.0 User Guide	£10
View Guide (View 2.1)	£4.50
Viewsheet & Viewstore Dabhand Guide	£12.95
Mastering View, Viewsheet & Viewstore.	£12.95
VIEW Dabhand Guide	£12.95
Viewsheet User Guide	£10
Viewstore User Guide	£10
Writing Interactive Interpreters & Compilers	£8.45
Wordwise + A User Guide	£9.95
Z88 Computing	£9.95
Z88 Using Your	£9.95

Carriage on Books vary between £1 to £3.50, depending on their weight.

BOOKS for IBM PC & Compatibles

1-2-3 For Business 2nd Edition	£20.95
1-2-3 Command Language	£19.95
1-2-3 Special Edition (QUE)–Using	£21.95
8086/8088 Assembly Language Prog.	£12.45
8086/8088 Programming the	£17.95
Ability–Using	£12.95
Accountancy software in Business – Using	£12.95
Advance C Tech & Application	£19.95
Advanced Tech. in Turbo Pascal	£19.95
Aldus Pagemaker–Using	£21.45
Amstrad Basic 2 Manuals	£12.95
Amstrad Technical Manuals	£19.95
(Please specify 1512 or 1640 when ordering)	
Amstrad PC Programmers Ref Guide	£7.50
Amstrad PC1512-1640 Step by Step – Using	£8.50
Autocad–Using Release 10	£26.95
Business companion on the 1640	£12.95
CP-M Handbook with MPM	£9.95
CP-M Plus Handbook	£13.95
CP-M Soul of	£16.50
dBase II & III–Understanding	£7.95
dBase II–Working with	£9.95
dBase III–Mastering	£21.95
dBase III Plus	£12.95
dBase III Plus–Mastering	£21.95
dBase III Plus Handbook 2nd Edition	£20.95
dBase III Plus – tips, tricks and traps (QUE)	£19.95
dBase III Plus–Quick Ref. Guide	£4.95
dBase III Plus–Quick Prog. Guide	£8.95
dBase 4–Understanding	£22.95
DOS Instant Reference (up to 3.3)	£10.95
DOS, Mastering for Versions up to 3.3	£19.95
DOS Power Tools (includes a disk)	£39.95
DOS Plus Manual/Amstrad PC	£10.95
DOS Plus–Mastering	£12.50
Excel IBM Version–Using the	£22.95
Hard Disk Manage IBM PC XT AT	£17.35
Hard Disc–Managing your 2nd Ed.	£20.95
IBM PS/2 Handbook	£19.95
IBM PC AT–Inside the	£20.95
Local Area Networks 2nd Generation	£19.95
Lotus 1-2-3 Desktop Companion Soft/B	£24.95
Lotus 1-2-3–Illustrated	£18.45
Mastering 1-2-3 2nd Edition	£19.95
MS-DOS–ABC's of	£16.95
MS-DOS Advanced Programming	£20.95
MS-DOS Handbook 3rd Edition	£18.95
MS-DOS Instant Reference Guide	£10.95
MS/PC DOS 3.3–Illustrated	£18.45
MS-DOS Masters–Tricks of	£22.50
MS-DOS Performance Programming Under	£18.95
MS-DOS Quick Prog Ref Guide	£8.95
MS-DOS Quick Reference Guide	£4.95
MS-DOS–Running 3rd edition	£21.95
MS-DOS–Supercharging	£17.95
MS-DOS Users Guide 3rd Edition	£20.95
MS-DOS–Using	£19.95
Operating the IBM PC Network	£18.45
Pagemaker–Desktop Publishing	£15.95
Pagemaker IBM PC–Mastering	£18.95
Pagemaker–Illustrated	£18.45
Programming Guide to EGA & VGA Cards	£20.95
Prog. Guide to IBM–P. Norton's	£19.95
Quattro–Mastering	£21.95
Smart–Using	£21.45
Smart–tips, tricks and traps (QUE)	£22.45
SuperCalc 4–Mastering	£19.95
SuperCalc 4–Using	£19.95
Symphony 4th Edition–Mastering	£24.95
Turbo Pascal Complete Ver. 4.0	£21.45
Turbo Pascal Program Library	£14.95
Upgrading & Repairing PC's	£22.95
Using DOS+ on the 1512 (95% OK for 512 Ed)	£9.95
Using Microsoft WORD 2nd Edition	£19.95
Using PC-DOS 2nd Edition Ver. 3.3	£20.45
Using Pagemaker on the IBM PC	£22.45
Ventura–Mastering	£21.95
Ventura Publishing–Instant incl. DISC	£34.75
Ventura Tips + Tricks	£18.95
Wordperfect 5–Using	£22.95
Wordperfect Desktop Companion	£20.95
Wordperfect–Illustrated	£18.45
Wordperfect 3rd Ed–Using	£19.95
Wordperfect Made Easy	£15.95
Wordperfect 5–Using	£22.95
Wordstar & CP/M made easy	£10.95
WordStar Release 5.0–Mastering	£19.95
WordStar 1512/1640–Using	£9.95
WordStar User's Ref. manual	£12.50
Wordstar–Quick program Ref. Guide	£8.95
WordStar 4.0–Using 2nd Edition	£18.45
Xerox Ventura–Desktop Publishing	£14.50
Xerox Ventura Publishing–Inside	£18.45

NEW

The Advanced Reference Manual for the BBC Master

At last Acorn's long awaited Advance Reference Manual for the BBC Master Series of Microcomputers has now been published. Watford Electronics' own authors have edited and added missing sections to the original script and produced a very high quality publication.

It features information about:

- Memory Organisation
- Slow data bus
- Detailed circuit description
- Keyboard controller
- Screen display
- User port
- Serial Processor
- Peripheral bus controller
- 1 Mhz Bus
- Machine operating System
- Second processors – Internal, Z80 and 80186
- Disc Filing Systems
- ANFS
- Terminal Emulator & Editor
- View internal format
- Detailed differences between Model B, B+, Master 128K and Compact
- Comprehensive appendix on 65C12 instruction set

At the rear of the manual there are pull out circuit diagrams for the Master 128K.
A worth-while addition to any Master owner's library.

All this for just £17 (NO VAT)

NEW

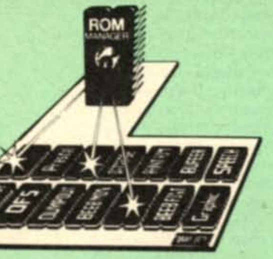
The Complete Mouse User Guide to BBC Micro

This manual has been written to reveal the secrets of the mouse. It explains all the principles required by the hardware and associated software, and also example listings for inclusion into custom programs. The manual first details the basic principles of the mouse and a simple program which uses these principles. This information should be adequate for most applications. However, it is possible to improve the performance of the mouse by expanding on the principles already used in the software. This is again fully explained and an example program given.
It is possible to gain a full understanding of the mouse from this manual. For those not interested in exactly how the mouse functions, complete example programs are also included. These may be typed directly into the micro, without the need for any understanding of the hardware or software involved, enabling the mouse to be used for custom applications.

Price £5.95
Example programs on Disc £4.95

Continued →

ROM MANAGER

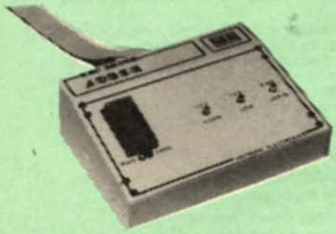


Take control of your Sideways ROMs with ROM Manager. This powerful utility ROM gives you power over your sideways ROMs. Disable whole ROMs, send commands directly to named ROMs and many other powerful facilities.

"Provides comprehensive management of all your installed ROMs". (BEEBUG November '84.)

ONLY £20

ADDER



The only low cost EPROM Programmer for the BBC Micro that will program both the standard 21V and the new 12V5, 27128 EPROMS.

Adder is the ultimate EPROM programmer for the BBC Micro. It will program many different EPROMs up to the very latest 27256 32K devices.

The Adder unit connects to the User Port and draws its power from there too. The EPROM is mounted in a top quality ZIF socket. There are no switches or controls as Adder is entirely software controlled.

The Adder software provides sophisticated facilities for programming EPROMs from a RAM image produced by loading disc files. The software is menu driven and designed for ease of use.

Features:

- Two ultra fast programming algorithms or standard slow algorithm.
- Supports standard 21V programming and newer 12.5 volt EPROMs. (Software switched).
- The RAM image to be programmed can be built up in many ways. Sections of image can be loaded separately. Part programming. Read EPROM. Edit data in memory.
- Automatic processing to handle a list of files to program into the EPROM.
- Automatic disc buffering to allow programming of 32K 27256 devices from a 32K file without extra effort.
- Verification gives detailed error list and checksums are maintained. There is also a blank check facility.
- Works with all standard filing systems. Generates header code for RFS ROMs to allow Basic programs etc. to be stored in EPROM. More than one file per ROM permitted.
- Programs the following EPROMs: From 2K to 32K: 2516, 2716, 2532, 2732, 2764, 2764A, 27128, 27128A, 27256 (Both 12.5V and 21V).

£72 (£5 Carr)

TEX EPROM ERASERS

EPROMs need careful treatment if they are to survive their expected lifetime. Over erasure of EPROMs very rapidly turns them into ROMs! The TEX erasers operate following the manufacturers specifications to give the maximum possible working life by not erasing too fast. We use these erasers for all our own erasing work.

- **ERASER EB** – Standard version erases up to 16 chips. **£28** (carr £2)
- **ERASER GT** – Deluxe version erases up to 18 chips. Has automatic safety cut-off to switch off the UV lamp when opened. **£30** (carr £2)
- Spare UV tubes. **£9**

Servisol Foam Cleaner

This 415MI, king size multi-purpose foam cleaner spray is ideal for cleaning the Keyboard, Monitor, Disc Drive and your computer furniture surfaces. Simply spray on the surface to clean and wipe off with a clean cloth.

£2.50

SPARES for BBC Micro

BBC Keyboard	**£42**	Speaker	**£2**
Master Keyboard	**£62**	Keyswitch	**£1.50**
UHF Modulator	**£4**	16MHz Crystal	**£4**
Speaker Grill	**£1**	32.768MHz Xtal	**£1.00**
Power Supply	**£56**	Master PSU	**£59**
BBC Casing	**£20**		

Replacement FLEXIBLE 17 way Keyboard Connector £3

Antistatic Aerosol Spray

Ideal for cleaning and preventing static build-up on TV/Monitor Screens.

£2.50

Aerosol Dust Spray

Aerosol Dust Spray

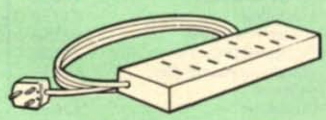
This simple to use aerosol spray is ideal for removing Dust and Dirt deposits from the Keyboards and similar inaccessible places. **£3**

SURGE PROTECTOR Plug

Fitted in place of your normal mains plug, this device protects your equipment against mains surges. Nearby lightning strikes, thermostats switching and many other sources which put high voltage transient spikes on to the mains. This can lead to data corruption in memory and on disc and can result in spuriously crashing machines. A must for every computer user.

Protection for only **£7.50**

4 WAY MAINS DISTRIBUTION SOCKET



4 way top quality mains trailing sockets. Supplied wired up with mains plug ready for use. Can be screwed to floor or wall if required. Very useful for tidying up all the mains leads from your peripherals.

£7.95 (carr £1.50)

SPIKES CLEANER UNIT

A 4 way mains distribution unit as above with a built-in Surge Arrester, providing protection for your complete computer system

£13.00 (carr. £1.50)

ROM EXTRACTION TOOL

This extremely useful tool allows you trouble free chip insertion and removal from your computer by distributing the removal force over the whole body of any 24 or 28 pin chip. **£2**

28pin DIL HEADER PLUG

SOLDER type **£1.50**; IDC CRIMP type **£1.95**

8 WAY DIP SWITCH

Increase the speed of your Disc Drives by soldering this switch to your BBC B or B+ Keyboard.

Only **£1.00**

28 pin ZIF SOCKET (Textool) £6.95

Watford DATA DUCK

Convert two single Disc Drives into one Dual Drive with this simple external unit (Suitable for Disc Drives with PSU. For Disc Drives without PSU, you will also require Watford Power Duck see below).

£14

Watford POWER DUCK £8

CONNECTING LEADS

(All ready made and tested)

CASSETTE LEADS 7 pin DIN Plug

to 5 pin DIN Plug + 1 Jack Plug	**£2.00**
to 3 pin DIN Plug + 1 Jack Plug	**£2.00**
to 7 pin DIN Plug	**£2.50**
to 3 Jack Plugs	**£2.00**
6 pin DIN to 6 pin DIN Plug (RGB)	**£2.50**

DISC DRIVE POWER LEADS

Supply from BBC power supply to standard Disc Drive connector.

Single **£3.00** Dual **£3.75**

DISC DRIVE INTERFACE LEADS

BBC to Disc Drives Ribbon Cable

Single **£4** Twin **£6**

Miscellaneous Connectors

	Plugs	Sockets
RGB (6 PIN DIN)	**30p**	**45p**
RS423 (5 pin Domino)	**40p**	**50p**
Cassette (7 pin DIN)	**25p**	**65p**
ECONET (5 pin DIN)	**20p**	**30p**
Paddles (15 pin 'D')	**80p**	**200p**
Disc Drive Plug 4 way	**75p**	–
6 way Power Connector	**80p**	**95p**

CREDIT CARD 24 HOUR Ansaphone Hot Lines (0923) 50234 or 33383

CHIP SHOP

DS3691	**£4.50**
DS88LS120	**£5.25**
LM324	**£0.45**
SN76489	**£5.50**
SAA5050	**£8.75**
UPD7002	**£6.00**
2764-250nS	**£2.80**
27128A-250nS (12V5)	**£3.00**
27128-250nS (21V)	**£5.25**
27256-2	**£3.99**
27512-2	**£7.99**
27C101G (1 Meg)	**£13.95**
4013	**60p**
4020	**£0.90**
4164-15	**£3.25**
4464-12	**£8.95**
4464-15	**£8.25**
4816 RAM	**£2.00**
41256-15	**£8.25**
41256-12	**£9.75**
6264LP-8K	**£6.00**
6502A CPU	**£4.50**
65C02 3M	**£9.75**
65C12	**£9.00**
6512A	**£10.00**
6522	**£3.40**
6522A	**£4.50**
62256ALS-15	**£12.50**
6818	**£4.00**
6845SP	**£6.00**
68B50	**£2.95**
68B54	**£7.50**
7438	**40p**
74LS00	**25p**
74LS04	**25p**
74LS10	**25p**
74LS123	**80p**
74LS163	**70p**
74LS244	**80p**
74LS245	**£1.00**
74ALS245	**£2.75**
74LS373	**£1.00**
74LS393	**£1.00**
75453	**70p**
75159	**£2.00**
8271	**£39**
9637	**£2.00**
ICL7673PA	**£2.00**

ACORN ADFS	**£25**
ACORN BASIC 2 plus User Guide	**£22**
Acorn BCPL	**£42**
Acorn COMAL	**£38**
ACORN DNFS	**£17**
Acorn FORTH	**£32**
Acorn Graphics	**£25**
Acornsoft C	**£52**
Acorn LISP	**£19**
Acorn LOGO	**£42**
Acorn OS B+	**£25**
Acorn OS 1.2	**£14**
Basic Editor	**£24**
BBC PCB Designer	**£49**
Beebfont	**£25**
Beebmon	**£22**
BROM Plus	**£32**
Buffer & Backup	**£20**
Communicator	**£49**
Commstar II	**£28**
EPSON NLQ ROM	**£25**
Graphics Extension Rom	
GXR-B	**£21**
GXR-B+	**£22**
Help II	**£27**
ISO Pascal	**£51**
ISO-Pascal Stand Alone Generator	**£30**
ICON Master	**£28**
Logotron LOGO	**£39**
Master OS ROM	**£38**
Master Termulator	**£32**
Micro Prolog	**£62**
Microtext Disc	**£46**
Microtext Rom	**£199**
Mini Office II ROM	**£43**
MUROM	**£21**
NLQ DESIGNER	**£25**
Pendown ROM	**£29**
ROMIT	**£29**
Serial ULA	**£13**
TED	**£35**
Termulator B, B+	**£25**
Termulator Master	**£32**
Toolkit Plus B, B+	**£31**
Video ULA	**£14**
ULTRACALC II	**£26**
1Mb OS ROM	**£39**

Now for a touch of FINESSE when you choose an Aries PC from Watford

... £300 worth of FREE Hardware and Software with every Aries PC System purchased from us

The Aries IBM PC-XT 88 and Aries PC AT286 compatibles are now supplied with Digital Research's GEM, the powerful Finesse 1.1, Desk Top Publishing package and Multiwriter WORDPROCESSING software, (in addition to PC Organiser, MSDOS and 12 months on site maintenance warranty). So not only you get the best all round value in PC compatibles, but you also get a complete and powerful WYSIWYG DTP software package that takes you from typewritten text onto typeset quality layouts. LOGITEK MOUSE too is included with the package.

WATFORD GIVES YOU MORE FOR YOUR MONEY.

P.S. To operate Finesse DTP, you require a Hard disc system.

ARIES PC-XT 88

Specification:

- 16 Bit Intel 8088-2 or NEC V20 78108 microprocessor, running at 8MHz or 4.77MHz. (3 times faster than IBM PC/XT).
- 8087-2 maths co-processor, optional.
- 640K minimum expandable to 1024K on system board, extra 384K RAMDISK available.
- 360K Single Floppy (optional 2nd Floppy/3.5"/20MB Winny/T. Streamer).
- CLOCK on System board, gives non stop DATE & TIME.
- 8 expansion slots.
- RS232 with two ports.
- Microsoft MS DOS 3.30.
- 102 keys keyboard.
- 150W power supply.
- GW-BASIC 3.21.
- Mono graphics/parallel card.
- Legal BIOS and built in games port and clock.

ARIES PC AT286

Specification:

- 80286 microprocessor.
- Optional 80287 Maths co-processor
- 640K RAM standard expandable on-board to 4MB.
- 1.2M Single Floppy (optional 2nd Floppy/3.5"/Winny/T. Streamer)
- CLOCK on System board, gives non stop DATE & TIME.
- 8 expansion slots.
- Serial/Parallel Card.
- Switchable Speed 8/12M Landmark test at 16MHz.
- Microsoft MS DOS 3.30.
- 102 key keyboard.
- HDD/FDD Card.
- 200W power supply.
- GW-BASIC 3.21.
- Mono graphics/parallel card (Herc. Compt.)
- Slide in metal case with function display.
- Legal BIOS and built in games port and clock.

FREE 12 month On-site Maintenance warranty (UK mainland) included in the price

Available in the following configurations:

- ***System 1** – Aries PC-XT 88 Basic System including FREE Bundled Software & Hardware* ***£445***
- ***System 2** – Aries PC-XT 88 system 1 as above plus 14" hi-res monochrome Flat Screen monitor* ***£489***
- ***System 3** – Aries PC-XT 88 System 2 as above plus a 720K 3.5" Disc Drive fitted* ***£579***
- ***System 4** – Aries PC-XT 88 System 2 plus a 20MB Hard Disk fitted* ***£799***
- ***System 5** – Aries PC-XT 88 System 2 plus a 40MB Hard Disk fitted* ***£849***
- **System 6** – Aries PC-XT 88/EGA hi-res Colour System, Aries EGA Monitor/EGA Card and 40MB Hard Drive fitted. **£999**
- **System 7** – Aries PC-XT 88 System 5 plus Ultra High Res VGA/Multisync Colour Monitor & Card plus 40MB Hard Disc Drive fitted **£1149**

Available in the following configurations:

- ***System 1** – Aries PC-AT 286 Basic System including FREE Bundled Software & Hardware* ***£759***
- ***System 2** – Aries PC-AT 286 system 1 as above plus 14" hi-res monochrome Flat Screen monitor* ***£799***
- ***System 3** – Aries PC-AT 286 System 2 as above plus a 720K 3.5" Disc Drive fitted* ***£889***
- ***System 4** – Aries PC-AT 286 System 2 plus a 20MB Hard Disk fitted* ***£995***
- ***System 5** – Aries PC-AT 286 System 2 plus a 40MB Hard Disk fitted* ***£1199***
- **System 6** – Aries PC-AT 286 / EGA hi-res Colour System, Aries EGA Monitor/EGA Card & 40MB Hard Drive fitted. **£1399**
- **System 7** – Aries PC-AT 286, Ultra High Res VGA/ Multisync Colour Monitor & Card plus 40MB Hard Disc Drive fitted **£1499**

FREE £300 worth of Hardware & Software with every Aries PC puchase from us this month.

Prices subject to change without notice and available on request. ALL OFFERS subject to availibility.
Mail Order and RETAIL SHOP. Trade and Export inquiries welcome.
Government and Educational Establishments' OFFICIAL ORDERS Accepted.
Shop Hours: 9.00am to 6.00pm. Monday to Saturday. Thursdays 9am to 8pm. (Free Customer's Car Park)

VAT: UK customers please add 15% VAT to cost incl. Carriage.
CARRIAGE: Unless stated otherwise, minimum £1 on all orders. £3 on Larger items. On bulkier items, £7 Securicor charge applies (UK mainland only). Overseas orders, carriage is charged at cost.

Specifications of all products are given in good faith but is subject to change without notice. Some items vary in their availability. Please ring for latest delivery situation.

Watford Electronics

JESSA HOUSE, 250 Lower High Street,
WATFORD WD1 2AN, ENGLAND
Telephone: (0923) 37774; Telex: 8956095;
FAX: 01 950 8989

ORDER VIA MicroLink 72:MAG030

THE BEEB BODY BUILDING COURSE

Micro makes a lovely mover

Mike Cook shows how to take control with a WholeBody Joystick

HERE we are at part 70 of the Body Building course and, as I mentioned last month, we'll take a break from the Experimenter's Board projects and look at something new. Way back in part 3 in May 1983 I looked at how to make a joystick. Now that hip-hop, rapping and body popping are all the craze we are going to re-visit the project, but not a boring, old, hand-operated job. Here's a whole new experience – the WholeBody Joystick.

The idea is simple – just strap on the armbands to any part of the body such as your legs, head or arms and wave your limbs to control your micro. Use your movements to create syncopated sound, rapping rhythm or even to control your favourite games in a new and challenging way.

The secret of this project is the mercury switch – see Figure I. Basically it is a small amount of mercury double sealed in a tube of glass within an epoxy envelope. At one end are two contacts and when the tube is tilted the mercury covers the contacts to make an electrical connection. This contact can then be sensed using the micro, and what that controls is up to you.

For simplicity we could connect the switches straight to the user port, but so much commercial software is designed to use the joystick port that I thought it would be more fun to use that. In this way you can try out this new concept not only with your own software but also with conventional games – although they will definitely not play conventionally.

The joystick – analogue input – port measures voltages and not just the on/off signals of the user one. When a joystick moves it produces a voltage between zero and another called Vref – nominally 1.8 volts. When it is placed centrally it produces a mid point voltage of 0.9 volts. This happens on both the left and right channel as well as on the up and down one. We have to arrange our circuit to produce the same effect by using a potential divider, as shown in Figure II.

Now a potential divider is just a name given to

> Now that hip-hop, rapping and body popping are all the craze here's a whole new experience

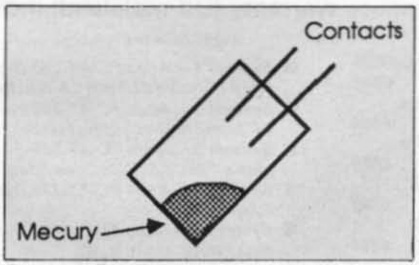


Figure I: A mercury switch

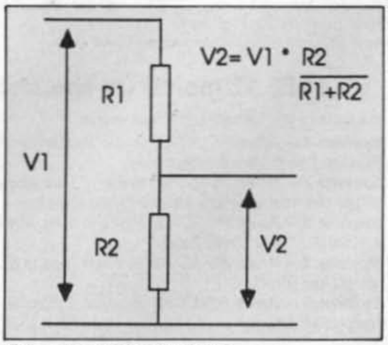


Figure II: A potential divider

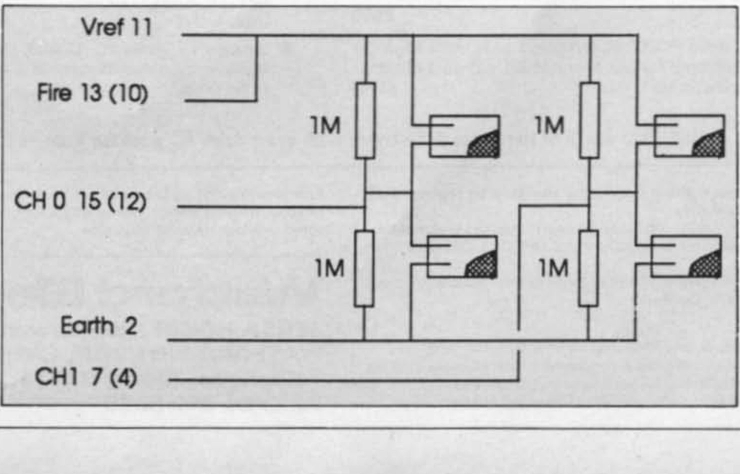


Figure III: The WholeBody Joystick. Numbers in brackets are for second joystick

two resistors in series. Whatever voltage potential is placed across them is divided by the ratio of the two resistances, and we can get this divided voltage across one of the pair. So all we need to do is to feed the reference voltage from the micro to a potential divider and take the centre tap to the analogue input. Now we place a mercury switch across the resistor to short it out when it is moved – the circuit is shown in Figure III. This will replace a single circuit.

The BBC Micro has the capacity to handle two joysticks. If you want to make a second one use the connection numbers in brackets. The fire button is connected to the reference voltage, and under normal circumstances will give a logic one signal. However, when both mercury switches are shorting out the potential divider resistors this point is effectively pulled to earth. In other words, it's just the same as pressing the fire button. Because of the internal construction of the reference voltage this is a perfectly safe thing to do.

As you may be new to construction work I have included Figure IV showing how to physically wire up the circuit. Each mercury switch has a resistor soldered across it and is connected to the joystick port by a screened cable. This is then connected to a 15 way D-type plug – remember to slip the cables through the 15-way plug shroud before you solder them up. Use cable ties to bundle together the four wires as they approach the micro to make for a neat job.

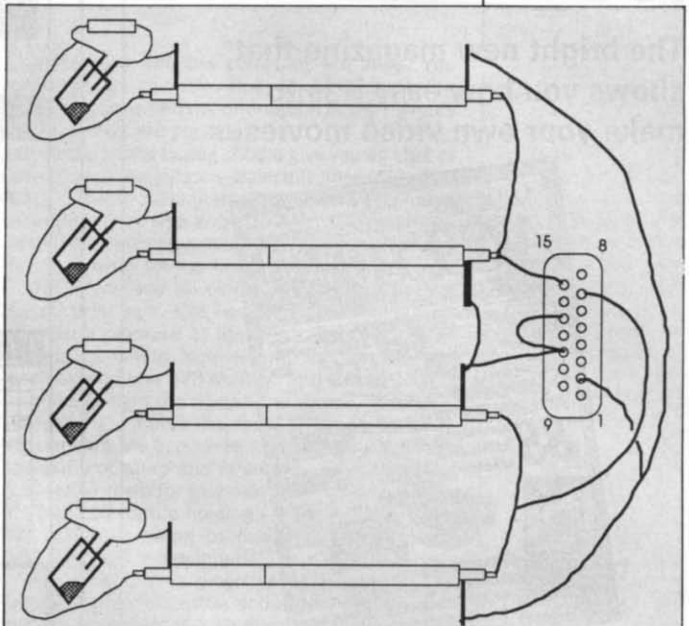


Figure IV: Practical circuit of the WholeBody Joystick

The next thing you need to do is to make the armbands. Basically these are a strip of material with velcro attached to the ends. In the centre is a pocket to hold the mercury switch. The band is placed round any limb and fastened with the velcro. Now any body movement will be translated

Turn to Page 109 ▶

Listing I

```
   10 MODE7
   20 PRINTTAB(0,4);"Whole Body Joystick
 TEST"
   30 PRINT"Beeb Body Building Course"
   40 PRINT"June 1989"
   50 PRINT"By Mike Cook"
   60 PRINTTAB(0,10);"Try to move the cr
oss"
   70 PRINT"using the joystick"
   80 PRINT"Fire button will leve its ma
rk"
   90 PRINT"Space bar to clear"
  100 PRINT:PRINT
  110 PRINT"Press any key to continue"
  120 REPEAT
  130 A$=GET$
  140 UNTIL A$<>""
  150 A$=""
  160 MODE 4
  170 I%=6
  180 GCOL 3,1
  190 VDU 5
  200 X%=500:Y%=500
  210 REPEAT
  220  OX%=X%:OY%=Y%
  230 A%=ADVAL(1) DIV 64
  240 B%=ADVAL(2) DIV 64
  250 IF A%> 600 THEN X%=X%-I%
  260 IF A%< 200 THEN X%=X%+I%
  270 IF B%> 600 THEN Y%=Y%+I%
  280 IF B%< 200 THEN Y%=Y%-I%
  290 MOVE OX%,OY%
  300 IF X%> 1248 THEN X%=1248
  310 IF X%<0 THEN X%=0
  320 IF Y%<32 THEN Y%=32
  330 IF Y%> 992 THEN Y%=992
  340 IF (ADVAL(0) AND 1)=0  THEN PRINT"
X" ELSE PROC_FIRE
  350 MOVE X%,Y%
  360 PRINT "X"
  370 IF INKEY(-99) THEN CLS:MOVE X%,Y%:
PRINT"X"
  380 UNTIL FALSE
  390 DEF PROC_FIRE
  400 VDU 7
  410 REPEAT
  420 A%=(ADVAL(0) AND 1)
  430 UNTIL A%=0
  440 ENDPROC
```

Get it right!

```
 10 = 8AFC C  |  160 = 20F1 A  |  310 = 48B0 9
 20 = CAF9 A  |  170 = D581 7  |  320 =  620 B
 30 = CCB2 D  |  180 = 38CB 2  |  330 = 6B5F 7
 40 = 5F75 A  |  190 = EC10 9  |  340 = 4F4D 1
 50 = FC23 E  |  200 = 9F67 F  |  350 = D0D3 3
 60 = E014 C  |  210 = BFBA 7  |  360 = C9D9 E
 70 = 7D8A 3  |  220 =  E61 1  |  370 = 7AF9 0
 80 =   C1 A  |  230 = 6B8B C  |  380 = 226C 9
 90 = 92E2 A  |  240 = B696 D  |  390 = DEC5 7
100 = C102 D  |  250 = A0EE 8  |  400 = CC52 B
110 =  31F C  |  260 = AF82 6  |  410 = BFBA 1
120 = BFBA E  |  270 = FFBE D  |  420 = FF87 9
130 = 77F2 A  |  280 = F0D2 2  |  430 = E7CF 6
140 =  2C6 9  |  290 =  1DF 9  |  440 = ED0F 4
150 = A5D6 8  |  300 = 2A9C 5  |
```

NOW OUT!

The bright new magazine that shows you how easy it is to make your own video movies...

VIDEO ACTION!
The COMPLETE guide for video camera users
A FACT-PACKED BUYERS' GUIDE TO 88 cameras, editors and enhancers
PLUS

If you have a video camera – or just thinking of getting one – you'll find *Video Action!* your passport to an exciting new world. No dull technical reviews but pages packed with help and advice – written by experts in a language ***anyone*** can understand. You'll find all you need to know about lighting, scripting, directing, sound dubbing . . . and the magic of desktop video – using a home computer to create titles and captions and generate your own startling special effects.

It's available at your newsagents now for £1.50. If you take out a 12 month subscription on the form below you'll save £5 off the normal price. *(UK only)*

ORDER FORM

Please send me the next 12 issues of Video Action! for the special price of £13 (normally £18) (1530)

Payment: Please indicate method (✓)

☐ *Access/Mastercard/Eurocard/Barclaycard/Visa* *Expiry Date* ___ / ___

No. ☐☐☐☐ ☐☐☐☐ ☐☐☐☐ ☐☐☐☐

☐ *Cheque/Eurocheque made payable to Database Publications Ltd.*

Name ________

Signed ________

Address ________

________ *Post Code* ________

Send to: Database Direct, Freepost, Ellesmere Port, South Wirral L65 3EB. Tel: 051-357 2961 MU5

REAL TIME
CONTROL APPLICATIONS
From Paul Fray Ltd

For School, Business, Home or Laboratory

SPIDER *The Software*

Fifty additional keywords expanding BASIC's control over the User Port, Serial Port and keyboard by invoking BASIC procedures from external events.

- *Foreground/Background processing*
- *ROM/RAM combination takes no memory*
- *Leaves BASIC programs unaffected*
- *Easy to install with no soldering*

— FROM £65 —

Archimedes version – Arachmid Now available

TERMITE *The Hardware*

- *Eight configurable input/output lines*
- *Status indicators for each line*
- *Outputs rated at 2A, 5 to 30V DC*
- *Opto-isolated and fused for safety*
- *Fully compatible with SPIDER*
- *Comprehensive manual including driver utilities*
- *Ideal for driving motors, lamps, sensors etc.*

— ONLY £89 —

Prices inclusive of VAT. Please add £3 for p&p

We also supply a full range of industrial digital, analogue and serial cards for use with SPIDER. For more information on any Paul Fray product please telephone (0223) 66529

(Trade Enquiries Welcome)

Paul Fray Ltd, Willowcroft, Histon Road, Cambridge CB4 3JD

NOW FOR RISC OS

A LOW COST DISC BASED
PROFESSIONAL ACCOUNTING PROGRAM

"MICRO-TRADER"
INTEGRATED SALES PURCHASE AND NOMINAL LEDGERS

Turn any BBC Computer from the humble Model B to the latest Archimedes into a fast, powerful business tool. 'Micro-Trader' can provide easy to use and timesaving computer accounts for businesses with a turnover up to £21 million per year.

Designed for business use by a business man. "Micro-Trader" offers full Sales and Purchase Ledger facilities including SALES INVOICE and STATEMENT PRINTING with a capacity of up to 1,000 accounts and 5,000 transactions per month.

Nominal Ledger features quick and easy entry of everyday transactions. Up to 6 Bank Accounts, full V.A.T. facilities, Journal Posting. Full Reporting for individual accounts, Audit Trail, Trial Balance, Profit & Loss and Balance Sheet.

"MICRO-STOCK"
Stock Control program, fully integrated with "Micro-Trader". 4,000 Stock Items with user defined Codes. Invoice and Credit Notes and Cash Sales routine. Full Stock Held Reports.
£75.00 + V.A.T.

ONLY £200 + V.A.T.

"EXTENDED PAYROLL"
Micro-Aid Full Feature Extended Payroll. For use stand alone or integrated with "Micro-Trader".
£49.95 + V.A.T.

"MICRO-MAILER"
A Mailmerge program, fully integrated with "Micro-Trader". With a user Database.
£30.00 + V.A.T.

ARCHIMEDES
Improved program for RISC OS features faster searches, larger capacity and improved analysis facilities.

Archimedes

PHONE TODAY FOR A FREE FACT SHEET

MEADOW COMPUTERS
11, LONDON STREET, WHITCHURCH, HAMPSHIRE, RG28 7LH
Telephone: Whitchurch (0256) 892008

◀ *From Page 107*

into signals that can be read by your micro.

Let's look at some software. Listing I shows a simple display screen and with this you can monitor your movements. It is written for one joystick and involves moving an X about the screen. Whenever the fire button is pressed – both mercury switches shorting – the X will leave a permanent mark and the computer will beep. You can use this to make fine adjustments to the band positions and the orientation of the mercury switch inside the pockets.

Looking at the listing should give you an idea of how to read the joystick. Basically lines 230, 240 read in the two channels, 250 to 280 determine which way to go with cross. In lines 300 to 340 we limit the coordinates to the size of the screen and line 340 tests for the fire button being pressed.

If it is pressed we call a procedure, if not we simply print an X. This has the effect of removing the last X because at this point the cursor is at the old X position. Now we print the X at the new position and line 370 tests for the spacebar. If it is pressed then the screen is cleared.

Listing II is a little more hip. This time the body movements are converted into sounds. Each has its own procedure and in this way you can easily customise them for your own requirements. Lines 170 to 210 form a holding loop and prevent any more sounds being produced unless there is some change in the inputs.

The exception is when you have, in effect, triggered the fire button and a series of random blips is produced. The sounds in the listing are of a cymbal, snare drum, and more random blips. I am sure that you can come up with better ones. Why not write in to us and let us know your favourite envelope and sound commands?

While I was developing this project I realised that it might be useful for handicapped people – particularly the sound listing which could be made to encourage movement by giving positive reward. The ready made armbands in the kit have been designed with this in mind and are colourful and sturdy.

You can also try playing your favourite game using the WholeBody Joystick. It will be a totally different experience. And there's no need to stop there: How about a program that outputs one note of a tune every time there has been some movement? In that way you could conduct your own orchestra.

The important thing, as in all Body Build articles, is to experiment and have fun. See you next month for something that does not require quite so much moving about.

> *And there's no need to stop there...*

Listing II

```
  10 MODE7
  20 PRINTTAB(0,4);"Whole Body Joystick

  30 PRINT"Body Popping Rap"
  40 PRINT"Beeb Body Building Course"
  50 PRINT"June 1989"
  60 PRINT"By Mike Cook"
  70 ENVELOPE 1,3,0,0,0,0,0,0,126,-4,-2
,-2,126,100
  80 ENVELOPE 2,3,0,0,0,0,0,0,80,-2,-2,
-2,80,40
  90 ENVELOPE 3,1,0,0,0,0,0,0,126,-3,-3
,-6,126,100
 100 REPEAT
 110 A%=ADVAL(1) DIV 64
 120 B%=ADVAL(2) DIV 64
 130 IF A%> 600 THEN PROC_S1
 140 IF A%< 200 THEN PROC_S2
 150 IF B%> 600 THEN PROC_S3
 160 IF B%< 200 THEN PROC_S4
 170 REPEAT
 180 IF (ADVAL(0) AND 1)=1 THEN PROC_S5
 190 A1%=ADVAL(1) DIV 64
 200 B1%=ADVAL(2) DIV 64
 210 UNTIL ABS(A1%-A%)>100 OR ABS(B1%-B
%)>100
 220 UNTIL FALSE
 230 END
 240 DEF PROC_S1
 250 SOUND 3,-15,RND(80)+30,1
 260 ENDPROC
 270 DEF PROC_S2
 280 SOUND &101,1,197,1
 290 SOUND &100,2,4,1
 300 ENDPROC
 310 DEF PROC_S3
 320 SOUND 0,3,20,1
 330 ENDPROC
 340 DEF PROC_S4
 350 SOUND 1,-15,RND(80)+30,1
 360 ENDPROC
 370 DEF PROC_S5
 380 SOUND 2,-15,RND(80)+30,1
 390 ENDPROC
```

Get it right!

```
  10 = 8AFC C     140 = DA21 8     270 = AF64 E
  20 = 80EA 4     150 = EC7C B     280 = 73E4 A
  30 = DA1C 9     160 = 3744 B     290 = DFBB B
  40 = CCB2 9     170 = BFBA 8     300 = ED0F 6
  50 = 5F75 F     180 = 829B B     310 = BF45 A
  60 = FC23 D     190 = F088 3     320 = 711E 4
  70 = 9C97 4     200 = E7AF 6     330 = ED0F 5
  80 = 73A5 5     210 = 77F6 8     340 = CFA2 D
  90 =  173 E     220 = 226C 4     350 = B71E 0
 100 = BFBA 2     230 = FD2E B     360 = ED0F 5
 110 = 6B8B 3     240 = 9F07 0     370 = DF83 A
 120 = B696 3     250 = F777 E     380 = 5F53 5
 130 = 419D 5     260 = ED0F C     390 = ED0F 5
```

BEEB BODY BUILDING PACK ORDER FORM

Body Build Packs:

☐ **51a** *Whole Body Joystick Kit Including cable, 15-way connector, 4 mercury switches and resistors. £20.00*

☐ **51b** *Whole Body Joystick assembled: All the above, assembled, plus 4 velcro arm bands £37.00*

Name ....

Address..

....

....

Post code ....

All prices include VAT and P&P

Educational establishment orders accepted.

Make cheques payable to Musbury Consultants and send to:
8 Fairhill, Helmshore,
Rossendale, Lancs BB4 4JX.

Foreign orders add £3.00 if airmail delivery is required.

MULTIPORT BUFFERS WITH 2 PRINTER PORTS

BOTH PRINTERS PRINTING DIFFERENT DOCUMENTS SIMULTANEOUSLY, SOFTWARE & MANUAL PRINTER SELECT, MULTIPLE COPY FUNCTION, SIMULTANEOUS DATA INPUT, AUTO SELECT.

WITH SOFTWARE PRINTER SELECT FACILITY

CENTRONICS		SERIAL	
PB12-S(64K) £269(d)	• 1 INPUT & 2 OUTPUT WITH 64K BUFFER & EXPANDABLE TO 256K.	SB22-S £375(d)	• 2 INPUT & 2 OUTPUT WITH 256K BUFFER & EXPANDABLE UP TO 1MB.
PB22-S £295(d)	• 2 INPUT & 2 OUTPUT WITH 256K BUFFER & EXPANDABLE UP TO 1MB.	SB42-S £495(d)	• 4 INPUT & 2 OUTPUT WITH 256K BUFFER (NOT EXPANDABLE
PB42-S £415(d)	• 4 INPUT & 2 OUTPUT WITH 256K BUFFER (NOT EXPANDABLE)		
PB82-S £755(e)	• 8 INPUT & 2 OUTPUT WITH 256K BUFFER & EXPANDABLE UP TO 1MB.		

FOR COMBINATION OF CENTRONICS & SERIAL INPUT & OUTPUT WITH SOFTWARE PRINTER SELECT FACILITY – PLEASE CONTACT

WITHOUT SOFTWARE PRINTER SELECT FACILITY

PB42-WS £365(d)	• 4 INPUT & 2 OUTPUT WITH 256K BUFFER & EXPANDABLE UP TO 1MB.	SB62-WS £655(e)	• 6 INPUT & 2 OUTPUT WITH 256K BUFFER & EXPANDABLE UP TO 1MB.
PB62-WS £545(e)	• 6 INPUT & 2 PUTPUT WITH 256K BUFFER & EXPANDABLE UP TO 1MB.		

CENTRONICS & SERIAL 256K MEMORY EXPANSION D RAM £80

MULTIPORT BUFFERS WITH 1 PRINTER PORT

PB21 £265(d)	• 2 INPUT & 1 OUTPUT WITH 256K BUFFER & EXPANDABLE UP TO 512K.	SB31 £375(d)	• 3 INPUT & 1 OUTPUT WITH 256K BUFFER & EXPANDABLE UP TO 512K.
PB41 £340(d)	• 4 INPUT & 1 OUTPUT WITH 256K BUFFER & EXPANDABLE UP TO 1MB.	SB71 £655(e)	• 7 INPUT & 1 OUTPUT WITH 256K BUFFER & EXPANDABLE UP TO 1MB.
PB71 £545(e)	• 7 INPUT & 1 OUTPUT WITH 256K BUFFER & EXPANDABLE UP TO 1MB.	UB64 £190(d)	• 1 SERIAL & 1 PARALLEL INPUT WITH 1 SERIAL & 1 PARALLEL OUTPUT WITH 64K & EXPANDABLE TO 256K.

INTELLIGENT INLINE PRINTER BUFFERS

PB64K	CENTRONICS 64K BUFFER	£150(d)	SB64K	• SERIAL 64K BUFFER	£170(d)
PB64-P	CENTRONICS 64K POCKET BUFFER	£100(a)	SB256K	• SERIAL 256K BUFFER EXPANDABLE UP TO 1MB.	£285(d)
PB64-2	CENTRONICS 64K BUFFER WITH BUILT IN 2 WAY MANUAL SWITCH	£195(d)			
PB256K	CENTRONICS 256K BUFFER EXPANDABLE UP TO 1MB.	£215(d)			
PB256-2	CENTRONICS 256K BUFFER WITH BUILT IN 2 WAY MANUAL SWITCH	£260(d)			

FOR SERIAL TO PARALLEL & PARALLEL TO SERIAL & BIDERECTIONAL CONVERTER WITH 64K BUFFER PLEASE CONTACT

SERIAL TO PARALLEL & PARALLEL TO SERIAL CONVERTER WITHOUT BUFFER AVAILABLE

Add postage: (a) **£2.00** (b) **£4.50** (c) **£5.50** (d) **£6.50** (e) **£8.50** + Cables **£1.00** each + 15% VAT

keyzone

KEYZONE COMPUTER PRODUCTS LTD
454 Sunleigh Road, Alperton, Wembley,
Middlesex HA0 4NW. (England)
Telephone: 01-900 1525 (4 lines) Telex: 8813271 GECOMS G Fax: 01-903 1486

VISA Access

We offer
a unique
inspection
copy service

NOW
RISC OS
COMPATIBLE

Have you
spent long hours struggling
with the programming complexities of the brilliant
Archimedes **WIMPS** system?

With **ARCHWAY** that's all behind you. Now YOU can easily and quickly build multi-window programs with pop-up menus, icons, mouse control, etc. of a professional quality.

ARCHWAY provides tools, bricks, mortar and a basic structure. YOU slot the final bricks into place and add finishing touches.

A comprehensive suite of integrated tools lets you define and edit windows, menus, icons, dialogue boxes, mouse pointers, sprites, fill and line patterns, anti-aliased fonts, short cut keys and much more! You can import files (eg ARM machine code and music editor).

The bricks include an extensive library of functions and procedures providing ready access to many of Archimedes' most powerful features.

An in-depth user guide (300+ pages, ring bound) takes you gently step-by-step through a progressive series of program building examples with the emphasis on clarity.

The ARCHWAY run-time package together with script shells in BBC BASIC provide the structure.

£79.95
incl. VAT & p/p

The complete system comes on 4*800k discs (3 tools & 1 run-time). You need 1M of RAM to run the tools. One disc drive is sufficient.

SPECIAL INTRODUCTORY OFFER: No charge for upgrade to the extended RISC OS 2.0 version we will release in May 1989. (£99.95)

SIMTRON *Programs to help you*

4 CLARENCE DRIVE, EAST GRINSTEAD,
WEST SUSSEX RH19 4RZ Telephone (0342) 328188

Access

Cheques/POs/official orders or Access/Visa number and expiry date. 24-hour 'phone for Credit Card orders.

VISA

TWO WAYS TO ENSURE YOU GET

THE MICRO USER

EVERY MONTH

1. Complete and mail subscription form on Page 135
2. Hand this form to your newsagent.

Please reserve me a copy of Micro User magazine every month until further notice.

☐ I will collect
☐ I would like it delivered to my home.

Name ______________________
Address ______________________

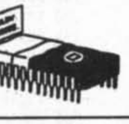
Note to newsagent: Micro User should be obtainable from your local wholesaler, or contact Circulation Manager on 0424 430422

Computer Repairs (UK)

2 Austins Place, High Street,
Hemel Hempstead, Herts, HP2 5HN.
Telephone: 0442 217624

REPAIRS

Archimedes .... P.O.R.
BBC Model B £45+VAT
Electron .... £35+VAT



FLIP-OVER FUNCTION STRIP HOLDERS

Each holder comes with 10 clear plastic sleeves. Easily fitted to the BBC or BBC - Master series.

only £6.50

Flip over function strip holder £6.50
Extra sleeves for above .... £0.40 each
Blank function strip cards .... 10 for £1.25
Function strip design software £4.50

SPECIAL OFFER

1 holder, 1 disc copy of software and 10 cards £10.00
OR 1 holder, 10 extra sleeves and 10 cards £10.00

<CR> VOLUME CONTROL SWITCH

Hardware volume control switch easily fitted to BBC......... £7.50

We specialise in 2nd user equipment
Telephone for price.

All prices include post, packing etc. in (G.B.)

CEEFAX Guide

B B+ M

Software is currently transmitted for a period of one week. Files are available from Friday afternoons to the following Thursday evening, with the exception of the Issues teachers' notes which, due to their topical nature, are available from the Wednesday morning to the following Tuesday evening during the week of transmission. The details are provisional only.

May 5 to 11

D/Info **Decode7**

This set of programs was devised to unravel the mystery of Mode 7 page creation. The hidden control and graphic codes which make up a teletext screen may be printed for examination and better understanding. A printer is essential.

Watch **Menu** **Sort**
Diction **IntroA** **IntroB**

Find spelling mistakes with this first part in a series of three broadcasts of a spell checking utility. It learns as you use it, remembering names, abbreviations and any other spellings specific to you. Written in machine code for efficiency, this package is the perfect complement for your word processor.

Speeder **Graphit**

Turn your micro into an easy to use speed checker with this neat package from the March issue of *The Micro User*. Results are accumulated and can be presented in a graphical form making it ideal as a project tool.

T/ATR01 **Monitor** **Connect**

The second tutorial in the series on interfacing with the Advanced Teletext Receiver takes a look at the Versatile Interface Adaptor which supplies the user port on the BBC Micro. A detailed study of its registers and how to access them, together with example programs demonstrating the topics covered are included in this week's module.

Notes for schools

Broadcast this week is information about the current schools programmes Scene, Make Up Your Mind and Secondary Science.

May 12 to 18

Index **T/index**

This program helps you find your way round directories to view or run programs. Index is an easy to use utility of particular value to Econet users.

Install **Technic** **Watchc**
Wasp **Wlink** **Menuc**

The second part of the personalised spell checker designed to complement your word processor.

Strike

Protect your planet from marauding invaders in this action-packed arcade game from the May 1983 issue of *The Micro User*.

T/ATR02 **Tuner**

Here's more from the series on the Advanced Teletext Receiver: This, and the next few modules, will be looking at ways of interfacing with the ATR hardware without using the ATS+ Rom. This week's example program, Tuner, demonstrates this technique.

Notes for schools.

Broadcast this week is information about the current schools programmes Scene, Make Up Your Mind and A level studies – Biology.

May 19 to 25

T/Insce **B/Insce**

This program allows records of your possessions and associated details to be stored with particular reference to your house insurance. This enables you to make an easier evaluation of the value of your belongings.

Brk **Data** **Mlink**
Sort **Setup**

The third and final set of programs to complement your word processor. Collectively, they comprise the very powerful spell checker utility designed to work with any Ascii file.

Phobia

Trapped in a maze on a far distant planet, you must navigate and collect treasure to survive. A superb 3D game from the January 1986 issue of *The Micro User*.

T/ATR03 **AHeader**

Another module in the series on the Advanced Teletext Receiver. The ATR header packet is examined this week with the aid of AHeader – this week's example program.

Notes for schools.

Broadcast this week is information about the current schools programmes Scene, A level studies – Biology and A level studies – History.

May 26 to June 1

Pen

This utility allows the easy creation of graphics characters and fonts by using a light pen. Touch a pixel once to illuminate it and again to toggle it off. Parameters for the VDU 23 command can then be listed and stored for future use.

GPlan **D/GPlan** **GRDPlot**
Plotter **TapeRec** **Stereo**

There's no need to buy graphical planning sheets any more. Obtain as many as you require with this Plotmate utility suite. Accurate drawings can easily be created and some samples are included. This package requires the Plotmate Rom for full use.

X-15

This week's program from the April 1985 issue of *The Micro User* takes you on a journey over mountains and cities, bombing and shooting at fuel dumps and bases. Define your own keys and dodge the missiles as you strive for victory.

T/ATR04 **ATRGrab**

This week's tutorial on the Advanced Teletext Receiver looks at the implementation of a simple page grabber written independently of the ATS+ routines. The example program ATRGrab demonstrates the principles involved and is fully documented.

June 2 to 8

NDumps **Proc**

This small procedure written in Basic resides invisibly in ram and gives a screen dump at the touch of a button at almost any time.

Clock

Keep better track of time with this very elegant version of a speaking clock. Just hit the spacebar to be told the time with no fuss. For those hard of hearing, or without the Acorn Speech Rom, a large graphical display of a clock face fills the screen.

Editor

Edit your discs, byte by byte if you wish, with this very handy utility from the April 1988 issue of *The Micro User*.

T/ATR05 **ATRWord**

Searching teletext for keywords is the subject of this week's look at the Advanced Teletext Receiver. With a little modification to the frame grabber examined last week, ATRWord has been written to demonstrate the techniques required for keyword searching.

The light

Steve Turnbull examines the first of a new breed of software

Product: Render Bender
Price: £79.95
Supplier: Clares Micro Supplies, 98 Middlewich Road, Rudheath, Northwich, Cheshire CW9 7DA.
Tel: 0606 48511

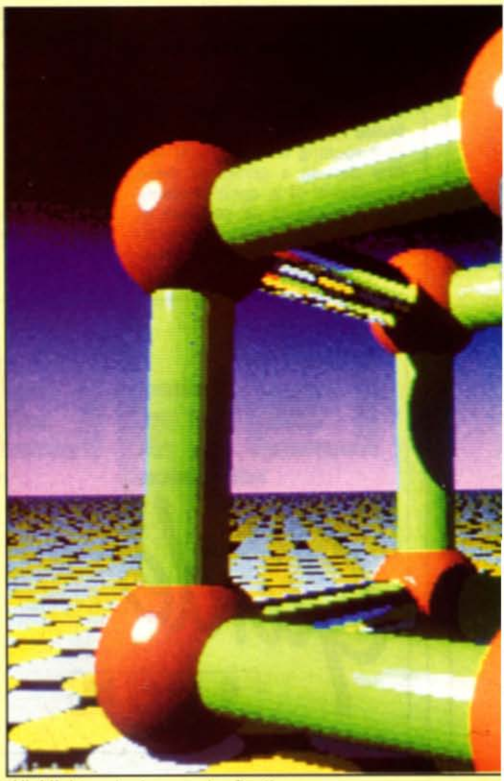
THE Archimedes is a machine waiting for software to really push it and at last such packages are beginning to appear. From Clares comes Render Bender which combines powerful ray tracing drawing with an animation facility to produce stunning effects. Ray tracing is a technique which draws a scene by following the route that light would take from the source to your eye – but backwards.

One ray of light for each screen pixel is traced back through the micro's model of the scene as it reflects off the floor, mirrors or passes through semi-transparent objects.

What the Render Bender does is allow you to describe a scene in terms of various objects, such as spheres or cones, their physical properties in relation to light – which cover their colour, reflectivity, transparency, whether they're matte, metallic or mirror and so on – plus their positions relative to each other.

Then you can specify up to four lights – beams, spotlights or simple point sources – and the place you want to view from. Then you can modify several global parameters such as picture size – whole screen, quarter, sixteenth and so on – and screen resolution – low is Mode 13 while high is Mode 15; both are 256 colour. Plotting without shadows is quicker but less realistic, you can control how much light is allowed to pass through each object and scenes usually look brighter and more effective when a low density is chosen.

Selecting the ray trace option starts the process. When you are designing a screen it is advisable to use low resolution plus the quarter or sixteenth size screen for speed. Putting up the complete screen should only be done when you're sure you've got it right as a very complex scene can take a very long time to draw.



Highlights, shadows and reflections

Although the objects provided for drawing are simple geometric ones it is possible to build up pictures of real objects by combining the basic building blocks. This can take a lot of work, but the results are effective – a demo of a tap is provided.

Animation is achieved quite simply but requires a lot more development work. You can have up to 26 variables in the scene description which can be set to a sequence of numbers – one for each frame of animation. By selecting the save picture icon you initiate the creation of the animation sequence.

The program draws the initial frame using the first set of variable values and saves the resulting picture in a compressed format. Then it draws the next using the second set of values, and so on. Once this process is complete you enter the Delta Animator and click one of the scene picture files.

The package can then be made to compile the animation and it's here that a clever trick is

WHAT'S IT FOR?

While the Render Bender is an amazing piece of software, its uses at first seem limited. There may be some scope in schools to assist in the teaching of optics, and the art department would be delighted with it – pictures can be saved in standard screen format and imported into art packages for more processing.

It might be useful for demonstration purposes by providing an artistic backdrop or even for putting on to the start of a home video. As a context-free package its uses are limited only by the imagination.

CEEFAX Guide

B B+ M

Software is currently transmitted for a period of one week. Files are available from Friday afternoons to the following Thursday evening, with the exception of the Issues teachers' notes which, due to their topical nature, are available from the Wednesday morning to the following Tuesday evening during the week of transmission. The details are provisional only.

May 5 to 11

D/Info Decode7
This set of programs was devised to unravel the mystery of Mode 7 page creation. The hidden control and graphic codes which make up a teletext screen may be printed for examination and better understanding. A printer is essential.

Watch Menu Sort
Diction IntroA IntroB
Find spelling mistakes with this first part in a series of three broadcasts of a spell checking utility. It learns as you use it, remembering names, abbreviations and any other spellings specific to you. Written in machine code for efficiency, this package is the perfect complement for your word processor.

Speeder Graphit
Turn your micro into an easy to use speed checker with this neat package from the March issue of *The Micro User*. Results are accumulated and can be presented in a graphical form making it ideal as a project tool.

T/ATR01 Monitor Connect
The second tutorial in the series on interfacing with the Advanced Teletext Receiver takes a look at the Versatile Interface Adaptor which supplies the user port on the BBC Micro. A detailed study of its registers and how to access them, together with example programs demonstrating the topics covered are included in this week's module.

Notes for schools
Broadcast this week is information about the current schools programmes Scene, Make Up Your Mind and Secondary Science.

May 12 to 18

Index T/index
This program helps you find your way round directories to view or run programs. Index is an easy to use utility of particular value to Econet users.

Install Technic Watchc
Wasp Wlink Menuc
The second part of the personalised spell checker designed to complement your word processor.

Strike
Protect your planet from marauding invaders in this action-packed arcade game from the May 1983 issue of *The Micro User*.

T/ATR02 Tuner
Here's more from the series on the Advanced Teletext Receiver: This, and the next few modules, will be looking at ways of interfacing with the ATR hardware without using the ATS+ Rom. This week's example program, Tuner, demonstrates this technique.

Notes for schools.
Broadcast this week is information about the current schools programmes Scene, Make Up Your Mind and A level studies – Biology.

May 19 to 25

T/Insce B/Insce
This program allows records of your possessions and associated details to be stored with particular reference to your house insurance. This enables you to make an easier evaluation of the value of your belongings.

Brk Data Mlink
Sort Setup
The third and final set of programs to complement your word processor. Collectively, they comprise the very powerful spell checker utility designed to work with any Ascii file.

Phobia
Trapped in a maze on a far distant planet, you must navigate and collect treasure to survive. A superb 3D game from the January 1986 issue of *The Micro User*.

T/ATR03 AHeader
Another module in the series on the Advanced Teletext Receiver. The ATR header packet is examined this week with the aid of AHeader – this week's example program.

Notes for schools.
Broadcast this week is information about the current schools programmes Scene, A level studies – Biology and A level studies – History.

May 26 to June 1

Pen
This utility allows the easy creation of graphics characters and fonts by using a light pen. Touch a pixel once to illuminate it and again to toggle it off. Parameters for the VDU 23 command can then be listed and stored for future use.

GPlan D/GPlan GRDPlot
Plotter TapeRec Stereo
There's no need to buy graphical planning sheets any more. Obtain as many as you require with this Plotmate utility suite. Accurate drawings can easily be created and some samples are included. This package requires the Plotmate Rom for full use.

X-15
This week's program from the April 1985 issue of *The Micro User* takes you on a journey over mountains and cities, bombing and shooting at fuel dumps and bases. Define your own keys and dodge the missiles as you strive for victory.

T/ATR04 ATRGrab
This week's tutorial on the Advanced Teletext Receiver looks at the implementation of a simple page grabber written independently of the ATS+ routines. The example program ATRGrab demonstrates the principles involved and is fully documented.

June 2 to 8

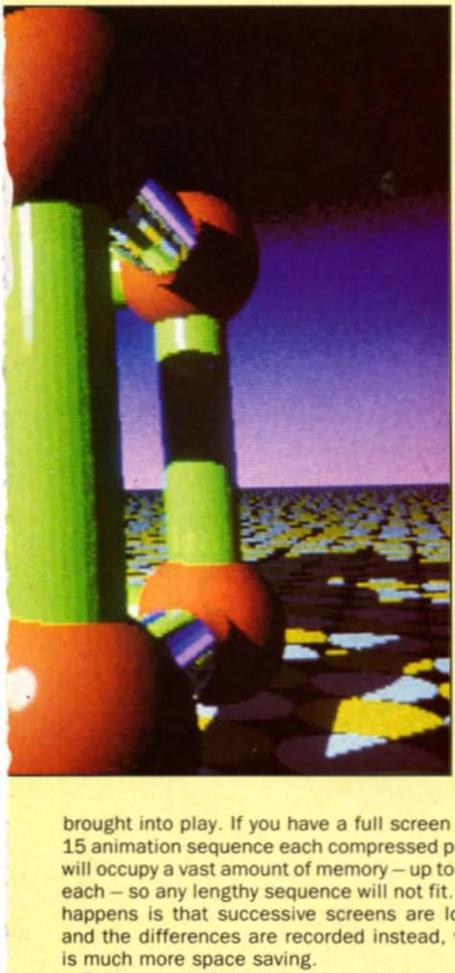
NDumps Proc
This small procedure written in Basic resides invisibly in ram and gives a screen dump at the touch of a button at almost any time.

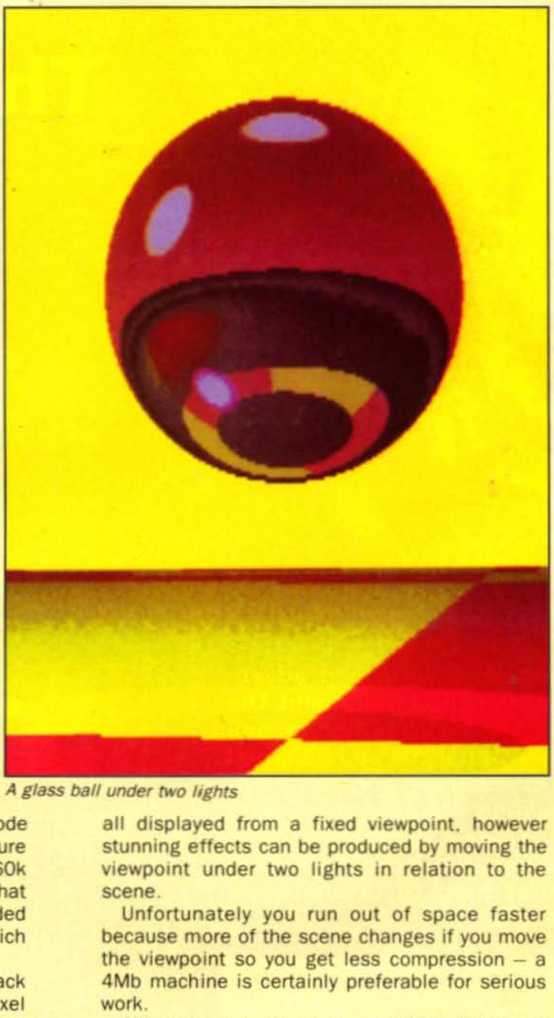
Clock
Keep better track of time with this very elegant version of a speaking clock. Just hit the spacebar to be told the time with no fuss. For those hard of hearing, or without the Acorn Speech Rom, a large graphical display of a clock face fills the screen.

Editor
Edit your discs, byte by byte if you wish, with this very handy utility from the April 1988 issue of *The Micro User*.

T/ATR05 ATRWord
Searching teletext for keywords is the subject of this week's look at the Advanced Teletext Receiver. With a little modification to the frame grabber examined last week, ATRWord has been written to demonstrate the techniques required for keyword searching.

fantastic





A glass ball under two lights

brought into play. If you have a full screen Mode 15 animation sequence each compressed picture will occupy a vast amount of memory – up to 160k each – so any lengthy sequence will not fit. What happens is that successive screens are loaded and the differences are recorded instead, which is much more space saving.

For example, if a block of four pixels are black in one scene and in the next the bottom right pixel is changed to blue you only need to know about the change to produce the second from the first. Once this process is complete you can edit the order in which the sequence is displayed, initiate it and your scene comes to life smoothly.

Using the system is fairly intuitive and by playing around with the example files supplied you can soon begin to grasp the concepts. The manual is concise – perhaps a bit too concise if you're not familiar with the subject. But the ease and speed of operation makes experimenting a viable proposition.

Having a good imagination is vital – you have to be able to work out the effect you're trying to achieve before you start. The demos provided are all displayed from a fixed viewpoint, however stunning effects can be produced by moving the viewpoint under two lights in relation to the scene.

Unfortunately you run out of space faster because more of the scene changes if you move the viewpoint so you get less compression – a 4Mb machine is certainly preferable for serious work.

Although we can't produce moving pictures on paper, the ones here illustrate just how good the Render Bender is – and believe me, onscreen it's even better.

> *‘Using the system is fairly intuitive and by playing around with the example files you can soon begin to grasp the concepts’*

Summing up

Render Bender is an excellent package and quite easy to use. The basic concepts need to be understood before you can get the best out of it, but experimentation is easy.

The scene description language is simple but some IF ... THEN construct would have been nice – perhaps in the next version?

While an A440 is best, you can produce effective images on an A310 so it's certainly worth buying on that basis.

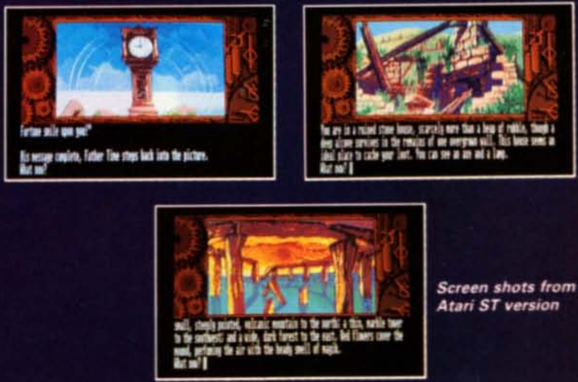
Time and magik

The trilogy

Interactive fiction from Level 9

Three of Level 9's most acclaimed adventures – Lords of Time, Red Moon and The Price of Magik – come together in one package. Each has been enhanced and enlarged with more text than ever before – 60,000 mind-expanding words creating magik and mystery round every corner. There's a powerful new parser, and most disc versions include stunning digitised pictures that help to dramatically heighten the atmosphere.

"Three excellent games ... the adventure bargain of the year" – *Your Amiga, June, '88.*
"Each is a classic – so buy it".– *ST Update, July, '88.*



Fortune smile upon you?"

His message complete, Father Time steps back into the picture.
What now?

Screen shots from Atari ST version

Please send me the following Time and Magik (tick the format you require):

£14.95	Tape		Disc	
Spectrum 48k/128k	☐	9095*	▨	▨
Commodore 64/128	☐	9001*	☐	9002
Amstrad CPC	☐	6070*	▨	▨
Amstrad CPC, PCW, Spectrum Plus 3	▨	▨	☐	6071
Atari XL/XE	☐	7048*	☐	7049*
MSX 64k	☐	9094*	▨	▨
Apple II	▨	▨	☐	1013*
BBC Master (80 track)	▨	▨	☐	2160

£19.95	Disc	
Atari ST	☐	9137
Commodore Amiga	☐	9600
Amstrad PC and PC compatibles	☐	5574
Macintosh	☐	1042

Tape versions come with three cassettes in every package

** Text only*

MANDARIN
SOFTWARE

Dealers: Ring Diane O'Brien on 0625 878888 for your free Mandarin Software information pack

☐ I enclose a cheque for £............(including VAT and p&p) made payable to Mandarin Software

☐ Please debit my Access/Visa card no:

☐☐☐☐ ☐☐☐☐ ☐☐☐☐ ☐☐☐☐

Expiry date: ☐/☐

Signature: ....

Name: ....

Address: ....

.... Postcode ....

SEND TO:
Database Direct, Freepost, Ellesmere Port,
South Wirral L65 3EB. Tel: 051-357 2961

Playing the money game

Don Turnbull audits a new personal accounts package for the Archimedes

Product: Home Accounts
Price: £49.95
Supplier: Minerva Software, 69 Sidwell Street,
Exeter EX4 6PH
Tel: 0392 437756

ALTHOUGH many of us prefer a state of blissful ignorance when it comes to considering our financial status this is not an attitude that is likely to lead to a splendidly wealthy retirement at an early age – quite the reverse. For devoted micro users there has never been much of an excuse for not keeping close tabs on personal and family spending. Now with the arrival of the Home Accounts package for the Archimedes from Minerva Software every excuse has gone.

This package is such a pleasure to use that it could have been called The Money Game.

Like all good programs, Home Accounts comes with a manual – in this case 50 pages of clear, concise and very readable data. The point is made early that this is the first of a new generation of programs for the Archimedes. In so far as it will run on both Arthur and Risc OS this is true. It certainly makes full use of the Wimp environment and multi-tasks when running under Risc OS.

As with other Minerva packages, a section is devoted to familiarising you with the program's features. You are taken through setting up a dummy file complete with deposit and current accounts, standing orders, rates and electricity bills. There is even provision for a mythical income to offset the outgoings.

Windows make the work fast and easy, with the main options displayed on the opening screen window – Home Accounts does not install itself on to the Risc OS icon bar but maintains the main window as long as it is running. This method is used so that it will operate under Arthur.

Opening the bank accounts window reveals *No accounts on file* while clicking Menu on this provides a list of options with only Add account available. Selecting this opens another window where you fill in the account details. A neat touch here is that a warning can be set to advise you when the cash in a particular account goes above or below a certain level – perhaps where you might incur bank charges or a certain rate of interest.

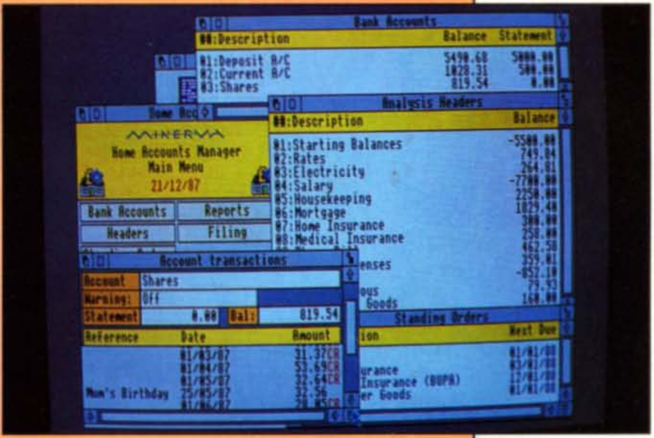
Working from one window to another is a great feature of the program. To put cash into the deposit and current accounts, for instance, a new window – Headers – is selected from the main menu and Add header chosen from the sub-menu accessed through it to provide an Analysis headers window. Entering starting balances here and using the mouse to drag it over to Deposit account in the bank accounts creates a receipts window where balances can be entered.

It works in reverse too. You can drag the current account across to a bill header, such as rates, whereupon a payments window appears so you can fill in the details. The selected accounts are automatically adjusted when you've completed this.

This may sound complicated but in practice it is quite straightforward. Having made these entries – and a few more – it's a bit of a letdown to find that it's already on the disc as Demo1. Still you learn more by working through it.

More interesting is Demo2, a very detailed bank account covering a long period. By calling up the graphics window from the main menu you can display information in bar chart or line form instantly and very flexibly.

Just dragging an account heading from the bank balance window on to the graphics one brings up the year's activity on the required item without any delay. Further items can be dragged to replace the current graph or, using Adjust, may be added – you can really see where the money is going.



00:Description	Balance	Statement
01:Deposit A/C	5490.68	5000.00
02:Current A/C	1028.31	500.00
03:Shares	819.54	0.00

00:Description	Balance
01:Starting Balances	-5500.00
02:Rates	749.04
03:Electricity	264.81
04:Salary	-7700.00
05:Housekeeping	2250.00
06:Mortgage	1029.40
07:Home Insurance	300.00
08:Medical Insurance	250.00

Account: Shares
Warning: Off
Statement: 0.00 Bal: 819.54

Reference	Date	Amount
	01/03/87	31.37CR
	01/04/87	53.69CR
	01/05/87	32.64CR
Mum's Birthday	25/05/87	32.56

Home Accounts in use

Elusive transactions buried in the accounts can be located easily by just typing the amount of a lost item in the appropriate window: This brings it to the top of the list displayed in the accounts transactions window.

Back on the main menu the reports icon enables any of a selection of accounts to be printed out – a hard copy can be useful when completing your tax return.

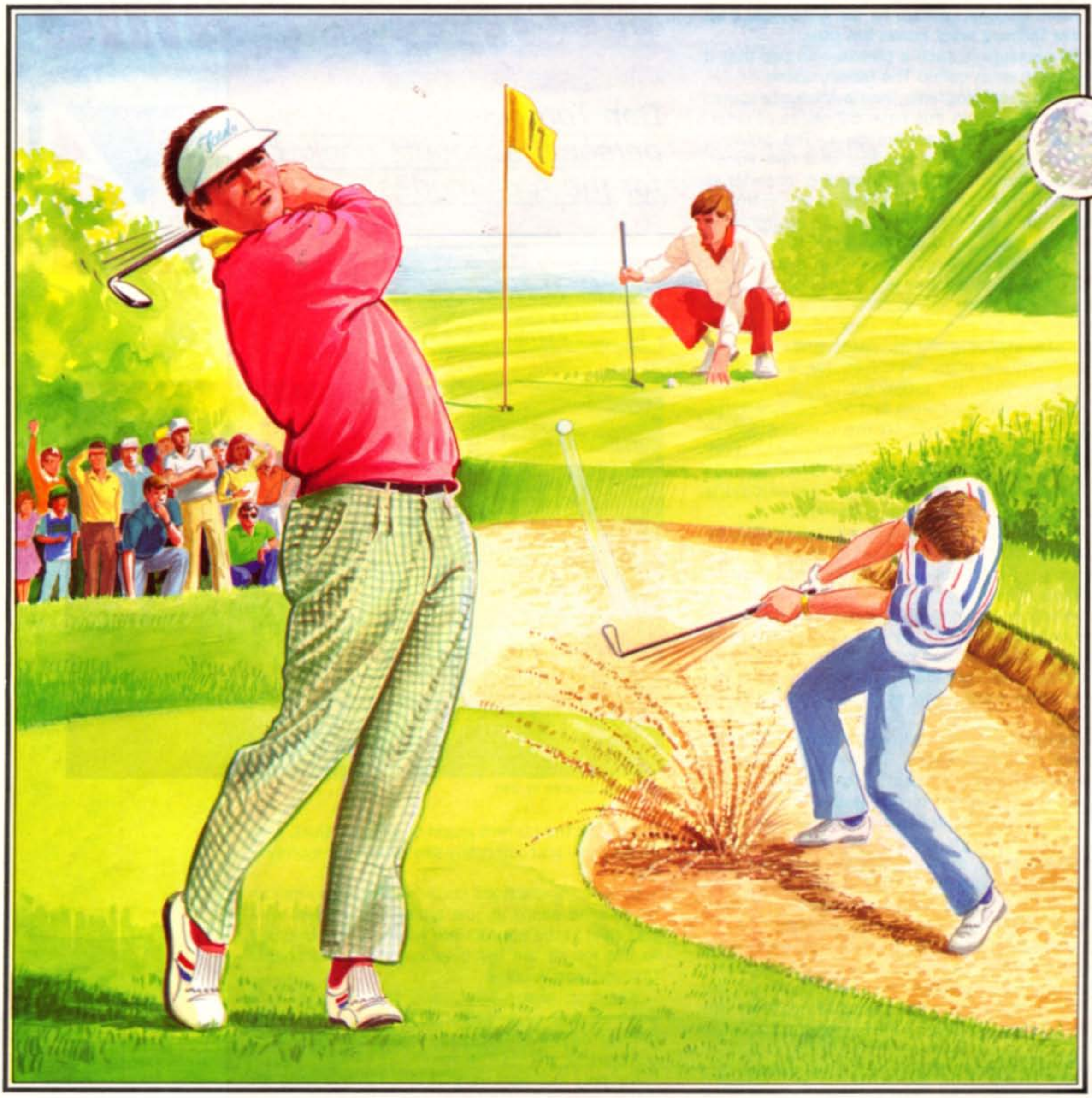
My only criticism is that if it had covered 18 rather than 12 months it would have been just that much more useful – we're a pretty untidy bunch out here in the real world.

Summing up

This very good, easy to use accounts package could make life much easier for a lot of people. It really does help to know where the money is going and whether you'll be able to afford that next item of hardware or software sooner or later.

BBC MICRO
ACORN ELECTRON
ARCHIMEDES

HOLED



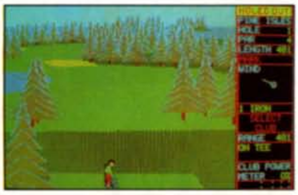
IDEAL FOR THE BEGINNER OR THE PROFESSIONAL

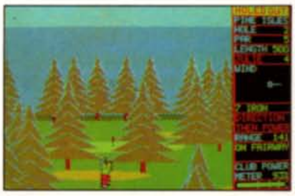
Whether you're young or old, male or female, beginner or professional, Holed Out has been designed especially for you. You can play alone or use the varying skill levels to allow up to 4 players of differing abilities to be more equally matched against each other. The game controls have been carefully selected for simplicity so that even the youngest or inexperienced computer user can play Holed Out.

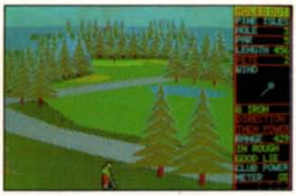
Included with the game is a well thought-out instruction manual giving all the information you will require and individual maps of all the 36 holes.

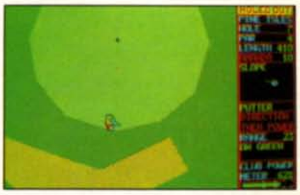
The Fourth Dimension

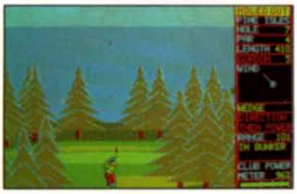
BBC MICRO
ACORN ELECTRON
ARCHIMEDES

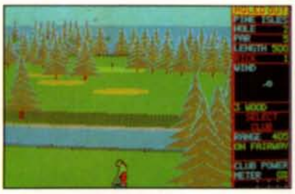

Driving off the 1st tee - a dogleg to the right.

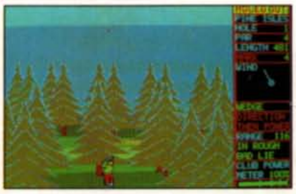

Using a 7 Iron to clear the trees.

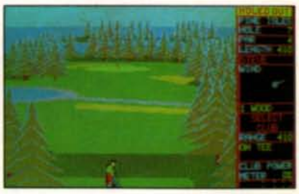

A good lie in the rough but there's a strong wind.


A long put with a tricky slope to the left.


A long bunker shot soars through the air to the green.


A left-handed player aims to clear the canal with a 3 Wood.


A high Wedge shot from a bad lie in the rough.


The Electron version is identical to the BBC version.

Designed by Golf Enthusiasts for Maximum Realism

1. **Two Contrasting 18 Hole Courses** - Once you've mastered the easier first course you should be ready for the greater challenge ahead.
2. **4 Skill Levels for Beginner to Professional** - Learn to play without worrying about the wind, bunkers or rough.
3. **1 to 4 Players** - Play alone or with friends. Each player can choose a skill level to suit their ability and thus make the match more even.
4. **High Resolution 3 Dimensional Graphics** - A full 3 dimensional view is given for each shot. Watch your player hit the ball into the distance. The shadow of the ball along the ground accurately shows you its progress.
5. **Excellent Sound Effects** - Several effects have been added to give extra atmosphere to the game. Hear the ball rattle in as you Hole Out. (An Eagle 'seems' to sound a lot better than a Bogie).
6. **Full Instruction Manual** - This features easy to follow guidelines, general rules of golf and detailed scale maps of all 36 holes.
7. **Reference Chart** - Gives summarised details of the maximum possible distances obtainable from each club. Also included are tips on how to deal with course hazards.
8. **Realistic Ball Flight Paths** - A great deal of attention has been paid to making the ball behave how it should in the real world.
9. **Variable Wind on Each Hole** - Wind varies significantly and can be blowing from any direction. Every round you play will be unique.
10. **Slice and Hook Capabilities** - You can use slice or hook to swerve your ball around the various hazards that you will encounter.
11. **Full Set of Clubs** - You carry 14 clubs. Woods 1, 3 and 5; Irons 1 to 9; Wedge and Putter.
12. **Accurately Defined Club Performances** - Each club's performance has been accurately simulated. You must consider your lie, the distance required, the wind conditions, the height required and the degree to which the ball will bounce and run along the ground.
13. **Bunkers, Trees, Water and Variable Rough** - These are best avoided as the consequences of an encounter have been 'lovingly' recreated.
14. **Authentic Greens** - Hazards, such as 'protecting' bunkers, will require you to plan your approach to each green carefully. Once made, the greens can be sloped in any direction and the gradients vary greatly. Putting is an art that will need mastering in its own right.
15. **Constantly Updated Full Scoreboard** - You can check your progress with a full record of all the players' performances on each hole.
16. **Matchplay or Strokeplay Options** - Play to win the most holes or try to get the lowest overall number of shots.
17. **Designed by a Team of Golf Enthusiasts** - as if you haven't guessed.
18. **All Versions Programmed by the Highly Acclaimed Programmer Gordon Key** - The above screenshots are taken from the BBC & Electron versions.

HOW TO GET HOLED OUT

Holed Out is available now from most good games outlets. If there isn't a stockist near you then we offer an instant mail order service.
Simply send us a quick letter telling us the version you require, your name and address, and payment via cheque, postal order or Access Card details. Your copy of Holed Out will be sent by First Class Post on the SAME day we receive your letter. We pay the postage and packing (overseas add £3).
Telephone orders with Access are also welcome.

HOLED OUT PRICES

BBC B/Master Cassette	£12.95
Acorn Electron Cassette	£12.95
BBC B/Master 5 1/4" Disc	£14.95
Master Compact 3 1/2" Disc	£15.95
Archimedes 3 1/2" Disc	£19.95

BBC and Electron versions available now.
Fully enhanced Archimedes version available from 3rd April, 1989.

The Fourth Dimension, P.O. Box 4444, Sheffield. Telephone (0742) 700661.

The Fourth Dimension

S·C·A·N
LIGHT

The scanner, interface & software for the Archimedes

TVM
Scan-Light File Scan Edit
SPRITE DESIGN
MAKE UP YOUR OWN CARTOON CHARACTERS

The Hardware

Scan-Light is based around the scanner interface used for FAX-PACK and provides a low cost way to input high quality scanned or 'digitised' text and pictures into the Archimedes.

Scan-Light consists of a half-width expansion board (that will fit into any Archimedes), on board ROM software and an 8.5 inch 200 dpi scanner.

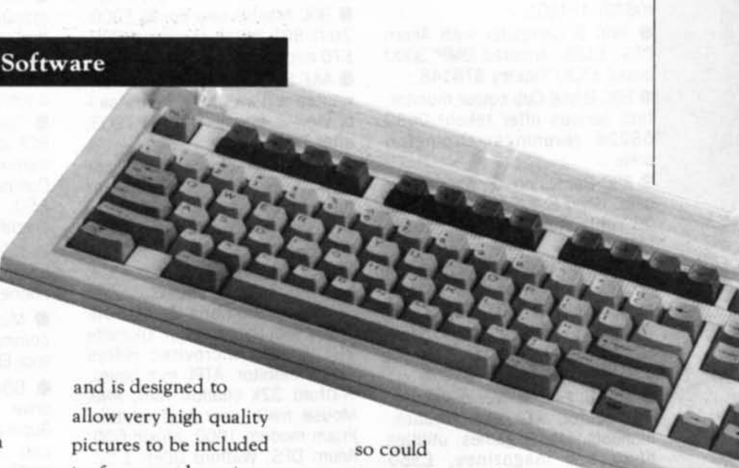
The hand-held scanner will scan pictures or text from loose pages, photographs and books, and because of its full A4 width it will scan complete A4 pages of text or pictures up to 8.5 by 11.5 inches in size. As such, it is far more flexible and useful than other 'half- width' scanners. The scanner also has a brightness control to cater for a range of document contrasts.

Scanning a picture is simple; the scanner is placed at the top of the picture, a menu option is chosen and the scanner is just rolled over the page. The scanner interface ensures the picture is scanned accurately at 200 dots per inch, irrespective of the scan speed.

Completely compatible with Arthur and the new RISCOS operating systems. It can, for example, run on the RISCOS desktop, where it can create files for direct use in the RISCOS paint or draw programs. These programs would allow the pictures to be edited or altered in an infinite number of ways.

28 days 'no quibble' money back guarantee, in addition to the normal 1 year parts/labour guarantee and free software update service.

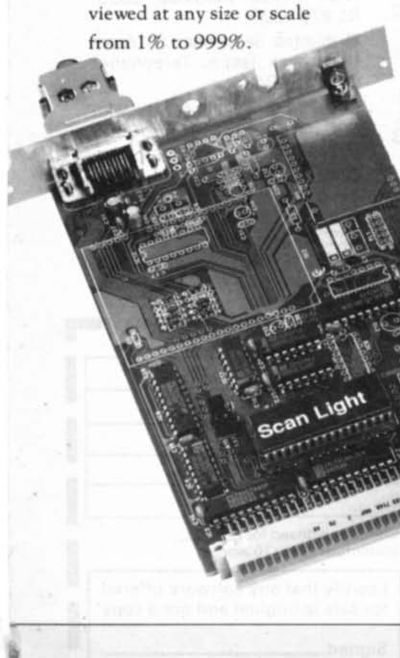
The Software



All the necessary scanner controlling software is included on a ROM as part of the scanner interface — it does not require a disc.

The software is WIMP based which makes it very easy to use, with all features being controlled by menu options. These features include:

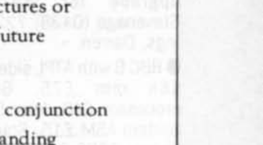
- The currently scanned page is viewed within a window, which can be scrolled and re-sized like all windows.
- It is possible to 'zoom in' or 'zoom out' so the scanned image may be viewed at any size or scale from 1% to 999%.
- Pixel editing facilities allow individual 200 dpi pixels to be drawn or 'undrawn'.
- Printer drivers are included to print the image to a variety of dot-matrix, inkjet and laser printers.
- The scan can be either a monochrome scan (best for text) or a 'half-tone' scan (best for pictures).
- The image may be viewed either as a monochrome, or 16 grey level picture.
- The whole image, or any selected part, may be saved in a variety of ways:
  - i) As a compressed data file (saves disc space).
  - ii) As a monochrome black and white sprite.
  - iii) As a 16 grey-level sprite. The latter option is ideal for photographs or pictures



and is designed to allow very high quality pictures to be included in, for example, paint programs, word processors or DTP programs.

Scan-Light is equally suited to capturing photographs from magazines, diagrams or printed text from books, or hand written notes or signatures. An entire A4 page can be scanned into the computer and then filed away on disc to be recalled later (so it can be viewed, subsequently edited or re-printed) and so could form the basis of an electronic document archiving system. It could also be used to build libraries of pictures or diagrams for future reference.

Scan-Light, in conjunction with the outstanding graphics facilities available on the Archimedes, finally takes computers away from their text only backgrounds, into a world where they can handle text and pictures with equal ease.



Hardware and Software runs on Arthur and RISCOS operating systems, requires 1 MByte machine.

Price £449.00 + VAT for scanner, interface board & software.

Computer Concepts Ltd

Gaddesden Place, Hemel Hempstead, Herts HP2 6EX
Tel: Hemel Hempstead 0442 63933

Access & Barclaycard welcome.

MICRO USER CLASSIFIEDS

- BBC B, data recorder, software, joystick, books. Boxed. £180 (0642) 484901.
- BBC B Computer with Acorn DFS, £185. Amstrad DMP 3000 boxed £130 Yateley 878148.
- BBC B and Cub colour monitor, first serious offer taken. 0689 58224 (evenings) Orpington area.
- BBC Games now unwanted, for sale. Send S.A.E to Mr K Jones, 25 Verity View, Leeds, W. Yorks, LS9 OEE.
- Wanted: Working Electron 32k or 64k. Will offer £15 or £25 respectively. Tel: (01) 942-2745.
- Cheap to clear. Viglen PC case, 8271 DFS, full height DS 40 track disc drive. Tel 0953 604255.
- BBC B, twin 40/80T disc drive, Datacorder, 16k swr, joystick, manuals, leads, games, utilities discs and magazines, £350 Phone: 06272 720.
- Wanted: Framework II version 1.0. Must be original. Phone: 0784-251612 (evenings).
- Wanted: Solidisk PC+ memory upgrade for Master 512. Stevenage (0438) 722901 evenings, Darren.
- BBC B with ATPL sidewise board 16k ram £75, 6502 2nd processor £40, Inter-Sheet £15, System ASM £15, Starbase £15. Phone: 0908 313916 evenings.
- Master Compact with colour monitor, 3.5in and 5.25in disc drives, games and accessories £399. Tel: 0373 827477.
- Watford 80186 Coprocessor package complete including all software, mouse and manuals, £150. Tel: 0792 864617.
- Master 128, 40/80T DS disc drive, blank discs, business software, superb condition £350 ono. Tel: Jayesh 01 427 8727 (after 4pm).
- Fanfold paper 11in x 14.5in. 7 boxes x 2000 £7 per box, £45 the lot. Tel: 01 864 1614 anytime.
- BBC Master new boxed £300. 2xoff 80T DSDD matching BBC, £70 each. Phone: 0274 543453.
- A&F Slave 16k utility rom. Unwanted will swop for Wordwise+ or View 3. Phone: 01 804 7903, after 7pm.
- Electron second processor 6502, very fast with slogger turbo, more memory with View etc, inc software £60. Wolverhampton 338214.
- BBC B Issue 7, Viglen case, External rom socket, Z80 processor Cumana Dual 80tk drives with PSU and fan, Okimate 20 printer, Microvitec H/Res colour monitor. ATPL rom board, Watford 32k shadow ram, AMX Mouse mk3, user port splitter, Prism modem 1000, Music 500, Acorn DFS, Watford DDFS 1.53, Solidisc 8271/1770 DFDC. Roms include: I/Sheet, I/Chart, I/Word, Wordwise+, Spellmaster, Exmon, Dumpout3, Watford Print, Communicator, AMX Art, Super Art, Max, Stop Press, Toolkit, Viewdata Emulator, Prestel. Discs include: Z80 software, Extra Extra, Vu-Type, Discmaster, Masterfile, Quickcalc. £1600. Phone: 0730 65843 anytime.
- Wanted: Teletext adaptor for around £60. Offers: Stephen Kay, 48 Corfe Crescent, Billingham, Cleveland, TS23 2DZ.
- Lots of BBC tapes for sale: Revs, aviator, data recorder, light pen. Will split. Tel: Maesteg 0656 733618 after 4pm.
- For Sale, 1st Word Plus (Archimedes) £60 ono. Wanted multi-sync mono monitor (0480) 860613 – Steve.
- Z88 with 128k ram, PC-Link, mains adaptor, PC batteries + charger, all boxed as new, plus Ian Sinclairs book and soft case £240 o.v.n.o. Tel: 0895 421873 (Uxbridge).
- Archimedes 310M colour, one month old, including, MS-Dos, first word plus, Artisan, plus over £200 of games, retail value over £1550 bargain at only £1150 o.v.n.o. Phone 0344 779592.
- Taxan Green 12 inch monitor RCA Jack, £65. Master reference manual 1+2, £15. Master Compact games 3.5in all 8 for £50. Tel: 0532 492959 evenings.
- Juki 5510 printer, Epson and compatible NLQ Mode, £100. Phone: 270730 after 6pm.
- Midi interface enabling Beeb communicate synthesizer £40 (not EMR) (0566) 85425.
- BBC B, Opus 40/80tk disc drive, printer, AMX Mouse II + Superart £150 of games, manuals , numerous other goodies worth £900 new only £400. Tel: Farnham 725926.
- Master 128, dual/DS drives, Microvitec colour monitor, Inter-Word, Spell-master, AMX stoppress, Dumpout 3, Office Mate/Master, Twin Joysticks, Exile, Elite, Sam 3, Zenon, data recorder, 60 discs, + box, Care cartridge. Most less than six months old. £675 ono. Also BBC B Issue 7, 1.44 DFS, Mini Office 2, Starquake, Revs+ 4 Tracks, all disc, £200 ono. Tel: 029256 554, after 6pm or weekends.
- Solidisc 1770+8271 DFDC unused complete with instructions £15, Livipac Eprom Eraser £5. Tel: 0233 629868.
- Electron, Plus 1, Plus 3, PMS-E2P, View/Sheet, T2P3, recorder, mint, £230. 0793 641309.
- BBC B cassetted, Micro-switched joystick, many games eg Sam 2 Impact Shark Bonecrusher. Perfect condition £175 ono. Staffs 0543 262189.
- BBC B with manual excellent condition £180, View word processor chip £15. Tel 0625 531222.
- Watford 65C102 second processor £95, Pace Nightingale modem, Commstar 2 £70, AMX Design £40, AMX Mouse, Mat, Superart £30, DCP Interbeeb Interface £40, CC Speech system £35, Big-ears speech recognition £20. Tel: Adam, Guildford (0483) 64345.
- BBC B Issue 7 (1770 DFS, ADFS, Wordwise) £300. Cumana twin 40-track single sided £125. Microvitec medium res. Monitor (colour) £100. Apollo modem, chip and manual £50. Tel: 0733 244682.
- Aries B32, Aries rom board, Nightingale modem + Commstar, lots of BBC software, send for list (upgraded to ARC). T Brown, 56 Stanley Hill Ave, Amersham, Bucks. 0494 431723.
- BBC B 1.2 OS, Welcome pack, dust cover, data recorder, manual, tapes, leads, software inc. Vu-Calc, Vu-Type, White-Knight. Hardly used, £225 ono. Tel: (0926) 492580.
- Disc drive 5.25in twin 40T s/s never used, still in box. Bargain £95. Chelmsford (0245) 461043.
- BBC B issue 7, Cumana 40tk drive, Sanyo green-screen, Epson FX80 printer, Wordwise, £350. 01 879 7826.
- Wanted September 84 Acorn User back issue. Telephone: 0727 59094.
- Centronics 737 printer with BBC cable £40. Tel: 09323 48241.
- Watford rom/ram card 32k dynamic ram, boxed unused with manual £30 ono. Tel: 0598 52526.
- BBC B issue 7, Opus DDOS

PLEASE PRINT THIS AD IN THE NEXT MICRO USER

Name____________________

Address____________________

Cheque enclosed for £______
(minimum £2 for 10 words)

I certify that any software offered for sale is original and not a copy

Signed____________________

POST TO: Micro User Classifieds, FREEPOST, Macclesfield, Cheshire SK10 4YB.

Has upgrading your BBC Micro given you hardware you no longer need?

Or have changing interests left you with unwanted software?

This is THE place to advertise your surplus items.

Our 179,000 readers are always on the lookout for a bargain and this is the first place they'll look!

An added bonus!
Your advert will be automatically displayed on MicroLink, the electronic mail service operated in association with Telecom Gold. This means it will be seen by thousands of computer enthusiasts who can send an instant response.

+32k Watford rom/ram board, joystick. £275 ono. Tel: Wakefield 0924 862102.

● Watford rom board, battery backed, two 6264 £25. Solidisk 1770 DFS /ADFS £30. T-Sheet £20, I-Word £20, I-Chart £15, Dumpout 3 £15. 0245 322984.

● Microvitec 143IMS Std-res colour monitor £100. Electron, Plus-1 and games £50. Phone: (Brighouse) 0484 719988 (evenings).

● BBC Master Compact Double 3.5in d/d. RGB colour monitor £432. Citizen 120D printer £84. Screenprint rom £10. Overview rom, Manuals £40. Loads of Software, offers? phone 0532 693077.

● BBC with brand new keyboard and Power Supply, 40/80 track DS DD drive, tape recorder, games, mags £325 ovno. Tel:0793 770263.

●Master 128k, 40/80tk drive, tape recorder, software, rom cartridge, reference manuals, magazines £400 ono. including joysticks. Tel (0728) 746315 (Suffolk)

● Coprocessor, Acorn model 65C102, barely used, immaculate condition, still under guarantee, with support disc and all documents. Cost £135, will take £100 ono. Tel (09277) 63894.

● BBC B Beginner would like penfriend for hints tips etc. All replies answered. Parsons, 40 Coniston Rd, Flitwick, Beds, MK45 1QH.

● BBC B, Issue 7, 1.2 O.S, Showroom condition. Cassette recorder and some software included, £180 ono. Tel: Winterbourne, Avon (0454) 773622.

● Assorted Micro User 84-87 (20), Beebug 83-87 (50). Offers 0452 21411 XT322 weekdays.

● Pace independent PSU for BBC B £30, Ferguson green screen monitor plus lead £30, Inter-Word, Inter-Sheet, Wordwise+ £25 each. Inter-Chart, Tapetodisc, Spellcheck III £15 each ono. Phone 0375 643763 evenings.

● BBC B, Dual Drives, sw ram, DDFS, rom/ram board, many roms, software £395. Tel: (0533) 861199.

● Acorn DFS (8271) with DFS or ADFS £50/55. Solidisk 1770 DDFS £35. 061 798 6608 After 6pm.

● BBC B, Acorn DFS 32k. Hardly used £160. Tel: 01 686 8380 evenings, or 01 238 5787 office hours.

● Z80 Wordstar urgently required by student. Not too expensive please. Phone: Paul 0384 298930.

● Daisywheel Printer, Triumph Adler TRD 7020, top of range, unused, boxed, guarantee. Cost £365 – accept £200 – 01 460 3194.

● BBC B issue 7, 40tk disc drive, Solidisk 1770 DDFS, Acorn speech system, Sleuth rom software, manuals leads etc. All as new first sensible offer secures. Tel: 0225 700010.

● Master 128, Stop Press, Extra Extra, Mewsofts A4 forms generator and filo-fax, Viglen cartridge system, 2 advanced manuals £250. DS 40/80T PSU Watford disc drives £100. Tel: 0226 285172. South Yorkshire.

● Master 128 plus Turbo board, 40/80 track (switchable) dual disc drives, double plinth, Quest paint + Mouse, Wapping Editor and other software, manuals. All only 4 months old £650 ono The lot. Contact Mark Neary on 01 668 3123 after 7pm.

● Master Compact, colour, 3.5in disc drive, games, accessories £300. Tel: 0706 817570.

● Render Bender upgrade and stunning 3D pictures and animations. Telephone: Simon, evenings 0892 260476.

● For Archimedes: 1st Word+ £60, Zarch £10, Conquerer £12, Terramex £10, Beebug DFS/ADFS Reader £6.50. 02993 4476.

● BBC B Issue 4, IBM disc drive with BBC leads, spare disc drive, 2 Joysticks, games, green monitor. V.G.C. £275 ono. 0784 258117.

● BBC B, Watford DDFS, Wordwise Plus, Cumana CD800S Twin D/D. Kaga KP810 printer. Plinth, manuals, immaculate £425. Tel: 0923 672182 (Watford).

● Torch Z80 + software + manuals £130. Eprom blower + eraser + 10 eproms + cartridge system £55. Miracle WS7000 modem £70. Offers considered. Tel: (0924) 469259.

● Master 512, 800k DD, Music 500, Smart cartridge, roms, eprom blower, mags, loadsa disc software £600. Tel: (0536) 722519.

● BBC B double disc drives, colour high res monitor, 6502 second proccessor, joysticks plus many roms, software and mags. Bargain £450. Phone: 0304 372614.

● Archimedes 310M, 20M Byte hard disc fitted, 5.25in floppy interface fitted for external drive, Philips CM8833 stereo colour monitor, £1100 ono. Tel: Day – 0705 257222, Eve – 0705 693398.

● Panasonic KX-P1081 printer (£100). Okimate 20 colour printer with colour screen dump (£90). Printer changer (1 computer to 2 printers) (£30). Cables and spare ribbons. All almost brand new. tel: 042873 5776.

● BBC Master with 80186 512k IBM proccessor, twin 40/80 track drives, Microvitec colour monitor, Epson LX-86 printer with tractor adaptor, all cables, original manuals software: GEM, Revs+4, Strykers run plus others, only £650 the lot. Ring: (02407) 2421, North London.

● Original Electron software, over 35 Titles: Last Ninja, Crazee Rider, Compelations, plus many more. Cost over £250, sell for £60 ono. Tel: 0502 715724 Mon-Fri after 6pm. (May Split) RING!

● Lots of Acorn hardware and software for sale. Tel: 01 743 1579 (evenings).

● BBC B OS 1.2, twin disc drive, joystick, Philips colour T.V, Acorn DFS, Transferom, Wordwise, £200 + software. Excellent condition, price £200. Tel: (0582) 602987.

● BBC B, Immaculate, data recorder, range of software + games. £145 ono. 0787 247027 evenings.

● Z88 portable computer, 32k and 128k ram Cartridges, four 128k rom cartridges , mains adaptor, eraser, parallel printer cable, manual and soft carrying case. Excellent condition, new value over £500, accept £225. Reading: (0734) 696409.

● BBC Master with 80186 IBM Processor, single 40/80 track drive, Spell Master, Inter-Word/ Chart roms, loadsa software including Gem, Office Mate/ Master. Only £650. Tel: (0372) 53461 after 6pm. Everything only 6 weeks old.

● Complete System: BBC Master 128, Phillips 14in green monitor, MT80+ printer, Cumana 40/80tk 5.25in DS/D drive. Value, £1400. Will accept £850. Includes quantity Acorn/Micro User magazines. Contact: S Chopra, (021) 422 1223 evenings.

● Peartree 'Profit' Accounts Package. Brand new + unused. Value £99. Will accept £50 ono. Contact: S Chopra (021) 422 1223 evenings.

●Micro User. Complete set from issue 1 in binders. Offers. Tel: (0633) 55250.

Ads will be accepted under the following conditions:

- This service is EXCLUSIVELY for the use of private readers. No trade ads will be allowed.
- To avoid encouraging software piracy, all ads will be carefully vetted before they are accepted.
- Ads can only be accepted on the form opposite (or a photocopy of it).
- There is no maximum to the number of words you include in your ad. If there is insufficient room on the form, continue on a separate sheet of paper.
- The cost is 20p per word, with a minimum of 10 words.
- *WE GUARANTEE your ad will appear in the next available issue of* The Micro User.

```
 1120 V1%=VALLEFT$(a$,1)-3:IFV1%=6GOTO11
60
 1130 IFV1%=7rr%=i%
 1140 V1%=(V1%*32)+&5000+ml%
 1150 PROCdraw(i%,V1%)
 1160 V2%=VALRIGHT$(a$,1)-3:IFV2%=6GOTO1
200
 1170 IFV2%=7rr%=i%
 1180 V2%=(V2%*32)+&5000+ml%
 1190 PROCdraw(i%+16,V2%)
 1200 j%=j%+1
 1210 NEXT
 1220 l%=l%+640
 1230 NEXT
 1240 FORI%=1TO6
 1250 READH%(I%)
 1260 NEXT
 1270 READnob%
 1280 FORzz=0TOnob%
 1290 READU%(zz)
 1300 NEXT
 1310 ENDPROC
 1320 DEFPROCcheck(w%)
 1330 LOCALv%
 1340 e%=0:P%=X%?w%
 1350 IFP%=107e%=7:ENDPROC
 1360 IFP%=202e%=8:ENDPROC
 1370 FORv%=1TO6
 1380 IFP%=H%(v%)e%=v%
 1390 NEXT
 1400 ENDPROC
 1410 DEFPROCsk
 1420 PROCdie
 1430 GOSUB1720
 1440 PROCdraw(p%,&5020+ml%)
 1450 liv%=liv%-1
 1460 ENDPROC
 1470 DEFPROCsn
 1480 GOSUB1720:rr%=p%
 1490 PROCdraw(p%,&5080+ml%)
 1500 b%=b%+1
 1510 PROCdraw(sx%,&50C0):sx%=sx%-16
 1520 PROCsc(250+addon%)
 1530 ENDPROC
 1540 DEFPROCta
 1550 GOSUB1720:PROCdraw(p%,&5040+ml%)
 1560 PROCdraw(X%,&50C0)
 1570 GOSUB1720
 1580 X%=p%
 1590 PROCdraw(X%,&50E0)
 1600 ENDPROC
 1610 DEFPROCba
 1620 PROCdie
 1630 wb%=-1
 1640 REPEAT
 1650 wb%=wb%+1
 1660 IFU%(wb%)=X%beast%=wb%
 1670 UNTILwb%=nob%
 1680 GOSUB1720
 1690 U%(beast%)=p%:PROCdraw(p%,&5000+ml
%)
 1700 liv%=liv%-1
 1710 ENDPROC
 1720 r%=RND(18):r%=r%*16
 1730 t%=RND(10):t%=t%*640
 1740 p%=r%+t%+&5F80
 1750 IF?p%>0GOTO1720
 1760 RETURN
 1770 DEFPROCsc(s%)
 1780 S%=S%+s%:S$=STR$(S%):l%=LENS$
 1790 COLOUR2:PRINTTAB(14-l%,2);S%
 1800 IFS%>=bonus%PROCbonus:bonus%=bonus
%+10000+(50*addon%):COLOUR3:PRINTTAB(1,2
);bonus%
 1810 ENDPROC
 1820 DEFPROCaction
 1830 IFe%=2SOUND0,-15,7,20:SOUND1,4,240
,20:PROCsk:ENDPROC
 1840 IFe%=3SOUND1,2,70,1:PROCta:ENDPROC
 1850 IFe%=4SOUND1,1,100,1:PROCsc(500+ad
don%):ENDPROC
 1860 IFe%=5SOUND1,6,160,1:PROCsn:ENDPRO
C
 1870 IFe%=6SOUND1,5,50,1:PROCba:ENDPROC
 1880 IFe%=7PROCex1:ENDPROC
 1890 IFe%=8r=RND(2):IFr=1PROCex2:ENDPRO
C:ELSEPROCex3
 1900 ENDPROC
 1910 DEFPROCmbad
 1920 R%=RND(4)
 1930 IFR%=1PROCmbr(M%)
 1940 IFR%=2PROCmbl(-M%)
 1950 IFR%=3PROCmbu
 1960 IFR%=4PROCmbd
 1970 ENDPROC
 1980 DEFPROCmbr(u%)
 1990 PROCcb(16):IFf%=1ENDPROC
 2000 FORO%=U%(z%)+12TO U%(z%)STEP-4
 2010 O%!u%=!O%:!O%=0
 2020 O%!(u%+320)=O%!320:O%!320=0
 2030 NEXT
 2040 U%(z%)=U%(z%)+u%
 2050 ENDPROC
 2060 DEFPROCmbl(u%)
 2070 PROCcb(-16):IFf%=1ENDPROC
 2080 FORO%=U%(z%)TOU%(z%)+12STEP4
```

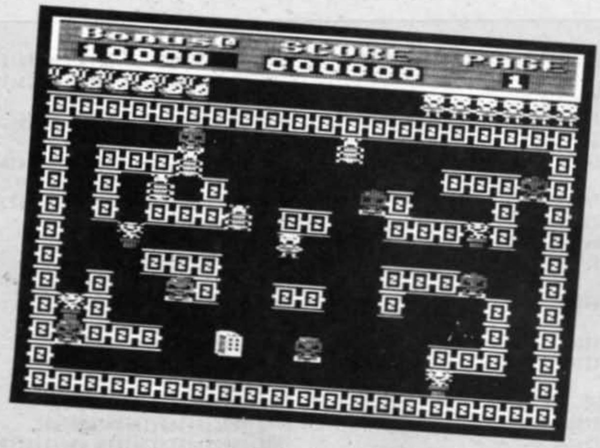
This is one of hundreds of programs now available FREE for downloading on MicroLink

```
 2090 O%!u%=!O%:!O%=0
 2100 O%!(u%+320)=O%!320:O%!320=0
 2110 NEXT
 2120 U%(z%)=U%(z%)+u%
 2130 ENDPROC
 2140 DEFPROCmbd
 2150 PROCcb(640):IFf%=1ENDPROC
 2160 FORO%=U%(z%)TOU%(z%)+12STEP4
 2170 O%!960=O%!320:O%!640=!O%:!O%=0:O%!
320=0
 2180 NEXT
 2190 U%(z%)=U%(z%)+640
 2200 ENDPROC
 2210 DEFPROCmbu
 2220 PROCcb(-640):IFf%=1ENDPROC
 2230 FORO%=U%(z%)TOU%(z%)+12STEP4
 2240 O%!-640=!O%:O%!-320=O%!320:!O%=0:O
%!320=0
 2250 NEXT
 2260 U%(z%)=U%(z%)-640
 2270 ENDPROC
 2280 DEFPROCcb(bw%)
 2290 LOCALv%
 2300 f%=0:G%=U%(z%)?bw%
 2310 IFG%=H%(6)f%=1:ENDPROC
 2320 IFG%=55liv%=liv%-1:f%=7:op%=X%:END
PROC
 2330 FORv%=1TO6
 2340 IFG%=H%(v%)f%=v%
 2350 NEXT
 2360 ENDPROC
 2370 DEFPROCbadact
 2380 GOSUB1720
 2390 IFf%=2PROCdraw(p%,&5020+ml%):ENDPR
OC
 2400 IFf%=3PROCdraw(p%,&5040+ml%):ENDPR
OC
 2410 IFf%=4PROCdraw(p%,&5060+ml%):ENDPR
OC
 2420 IFf%=5rr%=p%:PROCdraw(p%,&5080+ml%
):ENDPROC
 2430 IFf%=7SOUND1,5,50,1:PROCdie:GOSWB1
720:X%=p%:PROCdraw(X%,&50E0):PROCdraw(op
%,&5000+ml%)
 2440 ENDPROC
 2450 DEFPROCdie
 2460 FORI=1TO30
 2470 PROCdraw(X%,RND(255))
 2480 NEXT
 2490 PROCdraw(X%,&50E0)
 2500 PROCdraw(yx%,&50C0):yx%=yx%+16
 2510 ENDPROC
 2520 DEFPROCtune1
 2530 RESTORE2930
 2540 FORu=1TO12
 2550 READnote,dur
 2560 dur=dur/2
 2570 note=note+30
 2580 SOUND1,7,note,dur
 2590 SOUND2,7,note,dur
 2600 SOUND3,7,note-1,dur
 2610 NEXT
 2620 ENDPROC
 2630 DEFPROCtune2
 2640 chan%=1
 2650 RESTORE2950
 2660 FORu=1TO7
 2670 READnote,dur
 2680 dur=dur+2
 2690 SOUNDchan%,8,note,dur
 2700 FORT=1TO400:NEXT
 2710 chan%=chan%+1:IFchan%=4chan%=1
 2720 NEXT
 2730 ENDPROC
 2740 DEFPROCtune3
 2750 COLOUR1:PRINTTAB(5,15)"GAME OVER!"
 2760 RESTORE2970
 2770 FORu=1TO7
 2780 READa,b,c,dur
 2790 a=a+40:b=b+40:c=c+41
 2800 dur=dur/4
 2810 FORi=1TO4
 2820 SOUND1,9,a,dur
 2830 FORT=1TO140:NEXT
 2840 SOUND2,9,b,dur
 2850 FORT=1TO80:NEXT
 2860 SOUND3,9,c,dur
 2870 FORT=1TO60:NEXT
 2880 NEXT
 2890 NEXT
 2900 FORT=1TO3000:NEXT
 2910 ENDPROC
 2920 -- Tune 1
 2930 DATA89,4,77,4,61,8,61,8,61,4,69,4,
77,4,81,4,89,8,89,8,89,8,77,8
 2940 -- Tune 2
 2950 DATA129,4,125,4,109,4,101,4,89,4,8
1,4,77,4
 2960 -- Tune 3
 2970 DATA21,41,57,4
 2980 DATA41,57,89,4
 2990 DATA41,61,85,16
 3000 DATA41,61,77,4
 3010 DATA37,49,69,4
 3020 DATA21,37,49,4
 3030 DATA21,41,57,4
 3040 DEFPROCbonus
 3050 IFliv%=8ENDPROC
 3060 liv%=liv%+1
 3070 n=1
 3080 yx%=yx%-16
 3090 FORi=1TO3
 3100 FORq=&5000TO&50E0STEP&20
 3110 SOUND2,-13,90+n,1
 3120 PROCdraw(yx%,q)
 3130 n=n+4
 3140 NEXT
 3150 NEXT
```

Turn to Page 124 ▶

◀ *From Page 123*

```
 3160 ENDPROC
 3170 DEFPROCex1
 3180 SOUND3,8,150,8
 3190 SOUND3,8,134,8
 3200 PROCsc(5000+(RND(10)*1000))
 3210 ENDPROC
 3220 DEFPROCex2
 3230 FORI=0TOnob%
 3240 FORJ=1TO10
 3250 PROCdraw(U%(I),RND(255))
 3260 SOUND1,9,RND(255),1
 3270 NEXT
 3280 PROCdraw(U%(I),&50A0+ml%)
 3290 NEXT
 3300 st%=1
 3310 ct%=1
 3320 ENDPROC
 3330 DEFPROCex3
 3340 row%=0:q%=1
 3350 FORF%=1TO10
 3360 FORE%=&6210TO&6320STEP16
 3370 IFE%?row%=H%(1)PROCdraw(E%+row%,&5
0C0):W%(q%)=E%+row%:q%=q%+1
 3380 NEXT
 3390 row%=row%+640
 3400 NEXT
 3410 wu%=1
 3420 ENDPROC
 3430 DEFPROCwab
 3440 FORI=0TOnob%:PROCdraw(U%(I),&50C0)
:NEXT
 3450 PROCdraw(X%,&50C0)
 3460 FORo%=1TOq%-1
 3470 PROCdraw(W%(o%),&50A0+ml%)
 3480 NEXT
 3490 FORI=0TOnob%:PROCdraw(U%(I),&5000+
ml%):NEXT
 3500 PROCdraw(X%,&50E0)
 3510 PROCdraw(rr%,&5080+ml%)
 3520 ENDPROC
 3530 -- Screen 1 --
 3540 DATA1,3,4
 3550 DATAXXXXXXXXXXX
 3560 DATAYc^ccccccb
 3570 DATAYXY!!ccbX0
 3580 DATAYYOYcc0cbb
 3590 DATAYYXYbYbXDb
 3600 DATAY£cccccccb
 3610 DATAYcXYccbX1b
 3620 DATAYY^YbYbcbb
 3630 DATAVYcccccbb
 3640 DATATXY_c1cbXb
 3650 DATAYcccccc£cb
 3660 DATAXXXXXXXXXXX
 3670 DATA255,1,119,176,80,85
 3680 DATA3
 3690 DATA&64E0,&64F0,&6500,&6510
 3700 -- Screen 2 --
 3710 DATA1,3,5
 3720 DATAXXXXXXXXXXX
 3730 DATAScccEccc&
 3740 DATAYTYbXXUbbb
 3750 DATAYY£ccccc0b
 3760 DATAYcYcY1Ybcb
 3770 DATAYYYXYcYbbb
 3780 DATAYYYbcbXbbb
 3790 DATAY1Ybcbcbcb
 3800 DATAYYcccc£cbb
 3810 DATAYYE:XXYbbb
 3820 DATAS^cccOccc&
 3830 DATAXXXXXXXXXXX
 3840 DATA15,160,248,3,152,136
 3850 DATA3
 3860 DATA&6210,&6320,&7890,&79A0
 3870 -- Screen 3 --
 3880 DATA2,1,4
 3890 DATAXXXXXXXXXXX
 3900 DATASc^c.cccc&
```



Ready to start on Level 1

```
 3910 DATAYYXXXUXXbb
 3920 DATAYVcccc£cb0
 3930 DATAYYUXYYYXbb
 3940 DATAYYYcc^Ycbb
 3950 DATAYTYXXbYXDb
 3960 DATAYcY1cbccbb
 3970 DATAYYccV^bXbb
 3980 DATAWXXYYXbb:b
 3990 DATAS^ccYcccc&
 4000 DATAXXXXXXXXXXX
 4010 DATA76,52,3,68,112,80
 4020 DATA3
 4030 DATA&6210,&6320,&7890,&79A0
 4040 -- Screen 4 --
 4050 DATA2,4,1
 4060 DATAXXXXXXXXXXX
 4070 DATAYEc£cccccb
 4080 DATAYX_bYXcbDb
 4090 DATAYXbbYXb0c0
 4100 DATAY0b]_]bNbb
 4110 DATAXbbbYXb6bb
 4120 DATAYbb]1?bDbb
 4130 DATAY;bbYXbb£b
 4140 DATAYYE1Yc1bbb
 4150 DATAYYXYYXbc0b
```

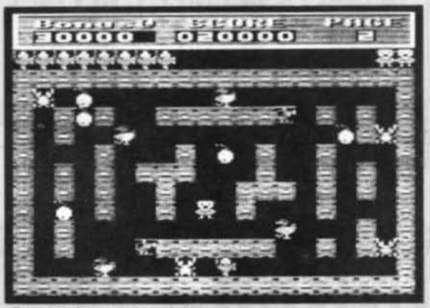
This is one of hundreds of programs now available FREE for downloading on MicroLink

```
 4160 DATAYcccccc£cb
 4170 DATAXXXXXXXXXXX
 4180 DATA240,51,48,252,153,14
 4190 DATA3
 4200 DATA&69F0,&6A30,&6EF0,&6F30
 4210 -- Screen 5 --
 4220 DATA3,5,1
 4230 DATAXXXXXXXXXXX
 4240 DATAUcc£ccccc:
 4250 DATAYX0YS0bYXb
 4260 DATAY]ccYb1]cD
 4270 DATAYXbTYYbYXb
 4280 DATAVccccYcccb
 4290 DATAYXYXYYVbXb
 4300 DATAYbccYcYc^b
 4310 DATAY]DTYXYSbb
 4320 DATAUcccccccXb
 4330 DATAXXcXDXYYW:
 4340 DATAXXXXXXXXXXX
 4350 DATA255,66,16,1,17,85
 4360 DATA4
 4370 DATA&6510,&6730,&67F0,&7380,&7470
 4380 -- Screen 6 --
 4390 DATA7,5,1
 4400 DATAXXXXXXXXXXX
 4410 DATAYc1ccc;ccb
 4420 DATAY'XXcEXX1b
 4430 DATAYcX;^ccX]b
 4440 DATAYcccYb'ccb
 4450 DATAYY0XYbXUbb
 4460 DATAY_ccVbO^cb
 4470 DATAY1';cc^c8b
 4480 DATAYcX£]ccXcD
 4490 DATAVYXXc1XX$b
 4500 DATAYcccEEcccb
 4510 DATAXXXXXXXXXXX
 4520 DATA240,66,48,255,16,136
 4530 DATA5
 4540 DATA&64A0,&6810,&6A40,&7140,&7410,
&7700
 4550 -- Screen 7 --
 4560 DATA2,4,1
 4570 DATAXXXXXXXXXXX
 4580 DATAYBEcc1c;cb
 4590 DATAYSXXX'XX'b
 4600 DATAYY_ccc;cbb
 4610 DATAYYXXYXXbbb
 4620 DATAUYbccYcb&b
 4630 DATAYTc8YcYc00
 4640 DATAYYXXXYYXbb
 4650 DATAYYcOccc;bb
 4660 DATATSXXX'XX'b
 4670 DATAYcc;;1c£Bb
 4680 DATAXXXXXXXXXXX
 4690 DATA240,4,7,2,80,112
 4700 DATA6
 4710 DATA&64B0,&6520,&6580,&6D00,&7630,
&76A0,&7700
 4720 -- Screen 8 --
 4730 DATA4,3,1
 4740 DATAXXXXXXXXXXX
 4750 DATAYccb1ccc1b
 4760 DATAYXcbccYXXD
 4770 DATAY!!cbYYXXD
 4780 DATAYcXcccYXXD
 4790 DATAYYBbcOYc0b
 4800 DATAYTcbccY;bb
 4810 DATAYXYb_1cXcb
 4820 DATAYXY0bYc!!b
 4830 DATAYXY0ccY£Xb
 4840 DATAYcccccYccb
 4850 DATAXXXXXXXXXXX
 4860 DATA255,2,17,51,48,3
 4870 DATA7
 4880 DATA&6720,&6730,&6740,&6750,&7460,
&7470,&7480,&7490
 4890 DEFPROCtable(sc%):PROCttx:*FX15
 4900 COLOUR2:Z=-1:REPEAT:Z=Z+1:UNTILsc%
>HS%(Z)OR Z=9:FORJ%=9TO Z+1 STEP-1:HS%(J
%)=HS%(J%-1):HS$(J%)=HS$(J%-1):NEXT
 4910 IFZ<9PRINTTAB(8,21)CHR$129"Enter n
ame: ";:INPUT"n$:HS$(Z)=LEFT$(n$,8):HS%
(Z)=sc%
```

```
 4920 @%=5:FOR I%=0 TO 9:VDU31,6,I%*2+3
 4930 PRINTI%+1") "HS$(I%)SPC(25-POS);HS
%(I%)
 4940 NEXT:REPEATUNTILGET=32
 4950 CLS:VDU26:ENDPROC
 4960 DEFPROCcheat:*FX15
 4970 INPUT"Level number ",ln%
 4980 ln%=(ln%-1)MOD8:pa%=ln%+1
 4990 ml%=ln%*256:sd%=ln%*170
 5000 VDU24,0;0;1279;828;:GCOL0,128
 5010 CLG:VDU26:ENDPROC
 5020 DEFPROCttx
 5030 CLS:FOR Z%=0 TO 1
 5040 VDU31,0,Z%,130,157,132,141
 5050 PRINTSPC5"The Five Alive Table"
 5060 NEXT:FOR I%=1 TO 21
 5070 VDU130,157,32,134,157,132
 5080 PRINTSPC30CHR$130CHR$157:NEXT
 5090 PRINTCHR$130CHR$157
 5100 PRINTCHR$130CHR$157;:ENDPROC
```

Get it right!

```
  10 =    0 0
  20 =    0 0
  30 =    0 0
  40 = 718D D
  50 = 4A8F 8
  60 = 14B0 E
  70 = EBCC 1
  80 = 5D74 C
  90 = 81F4 9
 100 = 7B31 1
 110 = F6E9 7
 120 = F716 4
 130 = E130 C
 140 = A836 4
 150 =  D55 0
 160 = 765B B
 170 = 1DC5 7
 180 = AC30 C
 190 = DEBB 9
 200 = A4D2 E
 210 = BFBA 8
 220 =  F06 9
 230 = B0B6 9
 240 = 6E81 C
 250 = 42AC C
 260 = 3B60 0
 270 = 79E0 9
 280 = F094 A
 290 = 28B0 7
 300 = 3747 5
 310 = 18A2 8
 320 = BAEE 7
 330 =   FC 7
 340 = 93A8 0
 350 = 8367 2
 360 = 32B5 1
 370 = 141E E
 380 = 344C 3
 390 = D3F0 9
 400 = 7E48 B
 410 = 8D5F 3
 420 = 7CF3 0
 430 = ED0F E
 440 = 363B 8
 450 = A0C2 2
 460 = C616 3
 470 = FCF0 1
 480 = A63B E
 490 = D000 7
 500 = 8608 C
 510 = 3177 B
 520 = FF4F 4
 530 = B935 D
 540 = 30BA 6
 550 = 2E43 E
 560 = AC23 3
 570 = ED0F 2
 580 =  23F 0
 590 = 8ACC 3
 600 = 6976 9
 610 = 2D0F 8
 620 = E531 5
 630 = 5A41 6
 640 = DA36 3
 650 = A617 C
 660 = 270A 9
 670 = 80EF 6
 680 = C366 E
 690 = 582C 8
 700 = ED0F E
 710 =  642 A
 720 = 5E38 D
 730 = CF4D 5
 740 = B791 D
 750 =  307 7
 760 = F253 4
 770 = 2AE6 7
 780 = 2B9E 8
 790 = F11F D
 800 = CF4D D
 810 = EBF4 A
 820 =  307 7
 830 = 7A95 5
 840 = DBD4 C
 850 = A9FD 4
 860 = E6AE B
 870 = CF4D 0
 880 = EBF4 D
 890 = 9691 E
 900 = 2C83 F
 910 = 52EA 2
 920 = ED0F 4
 930 = 958C 6
 940 = 85AB 3
 950 = CF4D F
 960 = EBF4 9
 970 = 3CC5 A
 980 = 2C83 C
 990 = 7573 2
1000 = ED0F 0
1010 = F5B9 D
1020 = 2775 6
1030 = C51F 4
1040 = AA6E E
1050 = 3652 7
1060 = E019 D
1070 =  9F4 9
1080 = 7E67 0
1090 = 8A96 E
1100 = 38EA F
1110 =  DB6 0
1120 = 8650 B
1130 = EDDA 0
1140 = 3ED7 D
1150 = 21C0 D
1160 = 154B A
1170 = 5C15 7
1180 = B8A1 F
1190 = DBDF B
1200 = BBE8 5
1210 = 2C83 8
1220 = 132A E
1230 = 2C83 6
1240 = EFBB 8
1250 = C642 2
1260 = 2C83 6
1270 = 84D9 0
1280 = 9E9A 3
1290 = 10F1 1
1300 = 2C83 3
1310 = ED0F 5
1320 = 1DD5 C
1330 = B1C8 0
1340 = 18C2 3
1350 = 9811 9
1360 = E0C3 4
1370 =  534 C
1380 = 7E9A D
1390 = 2C83 4
1400 = ED0F 7
1410 = 9C70 D
1420 = B83F 4
1430 = FB8E 3
1440 = 586C B
1450 = B934 A
1460 = ED0F 5
1470 = CCD5 2
1480 = 7D4F E
1490 = AB22 E
1500 = AD86 1
1510 = 81F2 4
1520 = 3AA1 1
1530 = ED0F 8
1540 = A4AD 1
1550 = FD9B 4
1560 = 74B6 B
1570 = FB8E E
1580 = 677E C
1590 = C616 D
1600 = ED0F 5
1610 =  D78 4
1620 = B83F D
1630 = 8AB5 B
1640 = BFBA 8
1650 = 3140 A
1660 = FE57 2
1670 = E077 8
1680 = FB8E 3
1690 = A58F 8
1700 = B934 2
1710 = ED0F 3
1720 = C9BA 7
1730 = EBE1 8
1740 =  CA6 9
1750 = 38C9 E
1760 = 6E17 C
1770 = 2C05 E
1780 = B525 7
1790 = 1B84 B
1800 = EC6A 5
1810 = ED0F B
1820 = D94E 7
1830 = FDE5 5
1840 = A14D 2
1850 = AF06 D
1860 = C744 A
1870 = 6344 6
1880 = 559B A
1890 = D2F6 E
1900 = ED0F 7
1910 = 1044 5
1920 = E899 2
1930 = 4A50 F
1940 =  958 A
1950 = CE39 F
1960 = ABFD 0
1970 = ED0F 1
1980 = 36ED F
1990 = 705A 1
2000 = 3D31 C
2010 = 6737 7
2020 = AA5C D
2030 = 2C83 8
2040 = 40D8 E
2050 = ED0F 7
2060 = FD1F 3
2070 = 7681 3
2080 = 684B 3
2090 = 6737 2
2100 = AA5C 7
2110 = 2C83 F
2120 = 40D8 2
2130 = ED0F C
2140 = FCED 9
2150 = 6130 3
2160 = 684B 6
2170 = 66AD 4
2180 = 2C83 E
2190 = D228 C
2200 = ED0F 5
2210 = FEFD 7
2220 = DAF6 B
2230 = 684B 1
2240 = 8893 A
2250 = 2C83 F
2260 = F5B1 8
2270 = ED0F 6
2280 = 3FAE 9
2290 = B1C8 3
2300 = 5425 9
2310 = E8C7 5
2320 = 6FFF F
2330 =  534 4
2340 = 26B9 F
2350 = 2C83 C
2360 = ED0F 1
2370 = 173D 7
2380 = FB8E 9
2390 =  A33 6
2400 = 3D63 4
2410 = EA2D 9
2420 = 8BDF 7
2430 = E950 C
2440 = ED0F 5
2450 = AEA7 7
2460 = A491 C
2470 = 4625 7
2480 = 2C83 1
2490 = C616 5
2500 = 552A F
2510 = ED0F 3
2520 = 89EF 5
2530 = EAC5 E
2540 = C6DE 9
2550 = FC6F 8
2560 = C17E 1
2570 = 5133 9
2580 = 9990 5
2590 = 9C0F F
2600 = 7A3B 7
2610 = 2C83 B
2620 = ED0F A
2630 = B98C 8
2640 = 494A 3
2650 = E631 C
2660 = 4DE3 6
2670 = FC6F 1
2680 =  DBA 8
2690 = 50F8 9
2700 = 23E7 1
2710 = 8FD6 E
2720 = 2C83 3
2730 = ED0F 2
2740 = A9AD 9
2750 = 5EFD 6
2760 = A02F 0
2770 = 4DE3 4
2780 = 7F11 0
2790 = 52B1 2
2800 = A1B8 4
2810 = F2F1 8
2820 = B3FA 7
2830 = CA41 C
2840 = 706C 2
2850 = F130 6
2860 = 311E 4
2870 = 536A 9
2880 = 2C83 8
2890 = 2C83 7
2900 = 5CB2 F
2910 = ED0F F
2920 = 5956 7
2930 = B541 B
2940 = 6935 E
2950 = EA11 A
2960 = 7914 2
2970 = F959 A
2980 = 9DE1 8
2990 = 3C16 D
3000 =  76D 5
3010 = 410B 7
3020 =   49 A
3030 = F959 A
3040 = 58C9 8
3050 = FC65 4
3060 = 1392 6
3070 = D5D1 F
3080 = C582 4
3090 = 8216 9
3100 = 41F4 6
3110 = 41A1 2
3120 = EB0B D
3130 = EFBA 8
3140 = 2C83 A
3150 = 2C83 5
3160 = ED0F 9
3170 = B3A4 0
3180 = EFB9 8
3190 = 14E0 5
3200 = EFB1 B
3210 = ED0F 0
3220 = 83C7 0
3230 = 204F 9
3240 =  C13 1
3250 = 6E74 9
3260 = 8D22 B
3270 = 2C83 3
3280 = 3054 2
3290 = 2C83 4
3300 = 435D 4
3310 = 4707 F
3320 = ED0F 1
3330 = 93E6 6
3340 = F526 9
3350 = 92EC 6
3360 = 8CC2 8
3370 = E808 2
3380 = 2C83 4
3390 = 899B 7
3400 = 2C83 E
3410 = BCEF 3
3420 = ED0F 8
3430 = 4DDA 0
3440 = 438C 0
3450 = 74B6 0
3460 = B7CC E
3470 = 4E7B 1
3480 = 2C83 E
3490 = 38D2 9
3500 = C616 6
3510 = 9348 3
3520 = ED0F D
3530 = 8710 8
3540 = D83D A
3550 = 7FA5 D
3560 = 37DB B
3570 = C8CD B
3580 = 2133 9
3590 = D538 B
3600 =  A27 1
3610 = 36EE 2
3620 = CCE7 0
3630 = 5979 0
3640 = 3C49 4
3650 = 7E33 1
3660 = 7FA5 8
3670 = 609F A
3680 = 567A C
3690 = 8B31 A
3700 = 1CCC 4
3710 = C81C E
3720 = 7FA5 C
3730 = 7ED3 1
3740 =  E45 E
3750 = AF60 E
3760 = 7B8E 0
3770 = 1036 1
3780 = CF9E A
3790 = 1F83 3
3800 = 9414 2
3810 = 4A7D 6
3820 = 924C D
3830 = 7FA5 6
3840 = E25C A
3850 = 567A B
3860 = 1755 F
3870 = 6A78 2
3880 = 588F 7
3890 = 7FA5 6
3900 = 8F09 5
3910 = A7FE 9
3920 = 76F7 E
3930 = 49A5 3
3940 = B1BE B
3950 =  FD0 5
3960 = E3D7 2
3970 =  D31 7
3980 = 68A2 7
3990 = B85D A
4000 = 7FA5 5
4010 = F863 4
4020 = 567A 3
4030 = 1755 C
4040 = 3B55 F
4050 = E3DA 3
4060 = 7FA5 3
4070 =  295 E
4080 = D90E E
4090 = 6A6A 3
4100 = 4CED C
4110 = E593 B
4120 = C388 8
4130 = A041 0
4140 = 78F2 A
4150 = 628E F
4160 = 7E33 7
4170 = 7FA5 9
4180 = E016 C
4190 = 567A B
4200 = EE63 8
4210 = 4DE1 A
4220 = 7EBB 8
4230 = 7FA5 A
4240 = C362 A
4250 =  7DB 6
4260 = A19A 8
4270 = 9EB1 5
4280 = 3B92 4
4290 = 8FE5 0
4300 = 5245 D
4310 = A7E6 6
4320 = 1972 8
4330 = E3EF 9
4340 = 7FA5 B
4350 = 6819 5
4360 = 269D 9
4370 = D241 4
4380 = D63D B
4390 = F7BD 5
4400 = 7FA5 8
4410 = 9359 0
4420 = CCCA 9
4430 = BC2B 8
4440 = 80D1 3
4450 = 5857 B
4460 = 5F25 A
4470 = AA8E 1
4480 = B14D A
4490 = 2AD1 1
4500 = 5ABB D
4510 = 7FA5 C
4520 = D15D C
4530 = 36BC B
4540 = 827E 8
4550 = A089 9
4560 = E3DA 5
4570 = 7FA5 D
4580 = 36C1 E
4590 = E35A 3
4600 = A85B E
4610 = C140 C
4620 = 131D A
4630 =  FE5 B
4640 = 5A61 7
4650 = C43A E
4660 = 6B61 9
4670 = 1EB9 F
4680 = 7FA5 F
4690 = 98E8 1
4700 =  6DF C
4710 = 18C4 5
4720 = 7467 8
4730 = ABCF E
4740 = 7FA5 C
4750 =  C0B 6
4760 = 8366 6
4770 = 2496 5
4780 = 5BCD 1
4790 = 2412 C
4800 = 5AB7 4
4810 = F891 F
4820 = 25EC C
4830 = F612 6
4840 = 6321 6
4850 = 7FA5 B
4860 = 826E A
4870 = 16FE 7
4880 = CD26 0
4890 = AF3B 1
4900 = 351E 4
4910 = B131 C
4920 =  E85 5
4930 = 86DE 6
4940 = D71F F
4950 = 4CEF 5
4960 =  42B 0
4970 = 45B4 E
4980 = 2465 9
4990 = F819 E
5000 = 9ACE C
5010 = F48E 9
5020 = 5B77 9
5030 = 7A00 1
5040 = 69A7 B
5050 = 4021 D
5060 = 2351 C
5070 = F5D4 D
5080 =  8AC 0
5090 = 980B 5
5100 = 3F67 A
```



Fast action on Level 2

◀ *From Page 50*

```
1130 REM K
1140 DATA AEHILNORSUVWY
1150 REM L
1160 DATA AEILOUY
1170 REM M
1180 DATA AEINOUY
1190 REM N
1200 DATA AEIOUY
1210 REM O
1220 DATA ABCDEFGHIKLMNOPRSTUVWXYZ
1230 REM P
1240 DATA AEFHILNORSTUY
1250 REM Q
1260 DATA U
1270 REM R
1280 DATA AEHIOUY
1290 REM S
1300 DATA ACEFGHIJKLMNOPQTUVWY
1310 REM T
1320 DATA AEHIMORSUWYZ
1330 REM U
1340 DATA BDGHIKLMNPRSTVXZ
1350 REM V
1360 DATA AEILOUY
1370 REM W
1380 DATA AEHIORUY
1390 REM X
1400 DATA AEIMOY
1410 REM Y
1420 DATA ACEHILOTU
1430 REM Z
1440 DATA AEILOUWY
```

Get it right!

```
  10 =    0 0    200 = BFBA 1    390 = B74C 9                                     890 = B2FB 7   1090 =    0 A   1270 =    0 D
  20 =    0 0    210 = FCD1 6    400 = A083 2                                     900 = E531 A   1100 = C8E2 2   1280 = B4D5 3
  30 =    0 0    220 = C84E 5    410 = FB3A D                                     930 =    0 A   1110 =    0 2   1290 =    0 3
  40 = BD77 7    230 = EF76 0    420 = 5002 A                    710 = D293 4     940 = 67A4 B   1120 = DB73 7   1300 = C2BC 6
  50 = 3859 F    240 = 2C83 B    430 = AF46 0    570 = 689D 8    720 = F72F 9     950 =    0 B   1130 =    0 7   1310 =    0 6
  60 =   A4 0    250 = F16E 4    440 = 92DE C    580 = 3C95 5    730 = 9B70 5     960 = 88E4 A   1140 = C069 4   1320 = 9D17 D
  70 = EE4D D    260 = 31A6 0    450 = BFBA F    590 = E9DD 5    740 = 804A 1     970 =    0 A   1150 =    0 4   1330 =    0 D
  80 = 8AB4 1    270 =  6AE 6    460 = 27B2 6    600 = 656D B    750 = CB10 D     980 = 5CE3 9   1160 = A2C1 4   1340 = C6A1 C
  90 = FCCE 9    280 = FAFC 1    470 = B547 4    610 = 2832 4    780 = 2C1D A     990 =    0 9   1170 =    0 4   1350 =    0 C
 100 = B583 D    290 = 8BA8 A    480 = BFBA C    620 = 311F 7    790 = C5AC 5    1000 = 3ECD A   1180 = 4FA9 1   1360 = A2C1 1
 110 = A1D0 C    300 = 2C83 F    490 = A10E 5    630 = FB3A 3    800 = F064 1    1010 =    0 A   1190 =    0 1   1370 =    0 1
 120 = 24BD B    310 = 23FD C    500 = 8885 D    640 = 492F B    820 = 10CF 3    1020 = 7C23 8   1200 = C2CA E   1380 = 397E F
 140 = 3275 6    311 = EEA6 7    510 = 6284 9    650 = FB3A A    830 = D984 C    1030 =    0 8   1210 =    0 E   1390 =    0 F
 150 = 96C2 C    312 = 56CE 0    520 = BFBA A    660 = C4CE C    840 = 846C 3    1040 = 6829 7   1220 = 4E8E 0   1400 = 4012 0
 160 = 46D3 C    320 = B642 9    530 = 84BE 4    670 = A154 4    850 =  521 E    1050 =    0 7   1230 =    0 0   1410 =    0 0
 170 = BC99 9    330 = AF08 C    540 = 2B01 3    680 = 2480 B    860 = ED0F 9    1060 =  810 F   1240 = 6D50 7   1420 = 7ACD 0
 180 = 1A0B 4    340 = 12BC 0    550 = C9DD E    690 =  6BC 7    870 = 4D25 4    1070 =    0 F   1250 =    0 7   1430 =    0 0
 190 = A083 7    360 = 37AA 9    560 = FAA4 3    700 = FD2E 0    880 = 2627 7    1080 = DBDD A   1260 = 1C43 D   1440 = BC7B 1
```

POOLSWINNER II

THE ULTIMATE POOLS PREDICTION PROGRAM

- **MASSIVE DATABASE** Poolswinner is a sophisticated Pools prediction aid. It comes complete with the largest database available – 22000 matches over 10 years.
- **PREDICTS** Not just SCOREDRAWS, but AWAYS, HOMES and NO SCORES.
- **SUCCESSFUL** SELEC guarantee that Poolswinner performs significantly better than chance.
- **ADAPTABLE** Probabilities are given on every fixture – choose as many selections as you need for your bet. The precise prediction formula can be set by the user – you can develop and test your own unique method.
- **SIMPLE DATA ENTRY** All team names are in the program. Simply type in the reference numbers from the screen. Or use FIXGEN to produce fixture list automatically (see below).
- **LEAGUE AND NON-LEAGUE** All English and Scottish League teams are supported, and also the non-league sides often used on pools coupons.
- **PRINTER SUPPORT** Full hard copy printout of data if you have a printer.

Boxed, with detailed instruction booklet

PRICE £18.00 (all inclusive)

NOW AVAILABLE

FIXGEN 88/9 AT LAST: No more struggling for hours to get the fixture list into the computer. FIXGEN has been programmed with all English and Scottish League fixtures for 1988/89. Simply type in the date, and the full fixture list is generated in seconds. Fully compatible with Poolswinner. Yearly updates available.

POOLSWINNER with FIXGEN £19.50 (for both)

COURSEWINNER V3

THE PUNTERS COMPUTER PROGRAM

NOT JUST A TIPSTER PROGRAM, Coursewinner V3 can be used by experts and occasional punters alike. You can develop and test your own unique winning system by adjusting the analysis formula, or use the program in simple mode. Coursewinner V3 uses statistical analysis of major factors including past form, speed ratings, course statistics, prize money, weight, going, trainer and jockey form etc, etc. It outputs most likely winners, good long odds bets, forecasts, tricasts etc. The database includes vital course statistics for all British courses. You can update the database – never goes out of date. *FULL PRINTER SUPPORT.*

PRICE £18.00 (all inclusive) includes Flat AND National Hunt versions.

AVAILABLE FOR

All supplied on tape ...
(Automatic Conversion to disc)
AMSTRAD CPCs
BBCs
COMMODORE 64/128
SPECTRUM

DISCS ...
(Add £3.00)
AMSTRAD PCW
IBM Format
COMMODORE AMIGA
ATARI ST

Send Cheques/POs for return of post service to . . .

selec SOFTWARE

phone 24 hrs

62 ALTRINCHAM RD, GATLEY, CHEADLE, CHESHIRE SK8 4DP. ☎ 061-428 7425

(Send for full list of our software)

BeebDOS version 2.02 (New) from MicroBoss

Software for BBC and IBM file interchange

Runs on IBM-PC-XT-AT or compatibles and supports DOS 2.0 or later
Supplied on 360K IBM diskette with manual and plastic wallet the software includes:

BCOPY	Copy files BBC – IBM, IBM – BBC, BBC – BBC (wild cards allowed)
BCONV	Flexible IBM file translate facility enabling text to be passed between VIEW, WORDSTAR and Displaywrite 3 amongst other uses.
BGRAPH	Display BBC mode 0,1,2,4,5 screen format (AMX Art included) files on IBM standard colour (CGA), enhanced colour (EGA) or Hercules screens for use in IBM PC presentation, DTP, drawing and other graphic applications.

BeebDOS is almost a complete BBC DFS/ADFS for the IBM PC with utilities to catalogue, format, backup, delete, lock, unlock, compact rename, alter title & options, map free space, change and create directories of BBC diskette/files.

In fact BeebDOS is probably the fastest and most powerful BBC/IBM PC file transfer method available and no cables or serial connections are required.

£46
Inclusive of VAT

BBC double density diskette formats supported are Acorn ADFS, Watford, Solidisk, OPUS DDOS and UDM. Acorn single density DFS is only supported when running BeebDOS on an IBM AT or XT286 with a 360k disk drive. Please send or phone for an information sheet

CHEQUE OR POSTAL ORDER TRADE/EDUCATION ENQUIRIES WELCOME
MICROBOSS LTD 3 HADLEIGH RD FRINTON ESSEX CO13 9HG TEL (0255) 671095

LABELMASTER PLUS

AVAILABLE AT LAST FOR MASTER AND ARCHIMEDES!

All your label-printing requirements in one extremely user-friendly program.
Many super new features - the most versatile and powerful labeller available.
All the features you could possibly want from a labeller - please telephone for details.

Single colour version
£24

Multi-colour version
(For colour printer)
£29

LABELMASTER still available for BBC B - described by the Times Educational Supplement as the best labelling software for BBC micros.

Single colour version
£18

Multi-colour version
£23

Please state model and disc format when ordering.

LABELS

45x11mm	1000 - £5.75	2000 - £10.50
70x24mm	1000 - £4.50	2000 - £8.00
70x36mm	1000 - £5.50	2000 - £10.00
89x36mm	1000 - £5.75	2000 - £10.50

All prices include VAT and p & p

LABELWISE, **17 Ingfield Terrace, Slaithwaite, Huddersfield HD7 5BJ**
(formerly Calderdata) **0484 846126**

THE PERFECT PAIR

The best-selling, award-winning BBC software is now joined by THE definitive guide

The Program

Mini Office II is the highly-acclaimed suite of integrated programs which turns your computer into a versatile business machine.

It's the perfect package to increase your personal productivity – with more than 400,000 satisfied users across the complete Mini Office range.

The Book

The Dabhand Guide to Mini Office II is a brand new book to help you get the most out of the software. It not only contains the facts, but also the kinds of hints and tips that can only be built up through years of computer use.

More than a manual, the guide assumes nothing. Beginning with the first sentences typed into the editor, you are led through all aspects of using the system, up to the most advanced techniques.

All the examples are also on an accompanying disc which even includes a very useful routine to print out large spreadsheets sideways.

What's more, when you buy Mini Office II and the book together we'll knock £5 off the combined price!

Please turn to the order form on Page 135

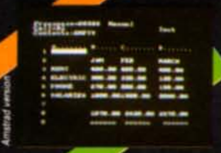
A Dabhand Guide
BRUCE SMITH
ROBIN BURTON
Mini Office II
BBC B B+ Master Series version
DABS PRESS
mini OFFICE II
DATABASE SOFTWARE

BBC version

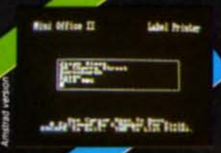
WORD PROCESSOR: Compose a letter, set the printout options using embedded commands or menus and use the mail merge facility to produce personalised circulars.

C64 version

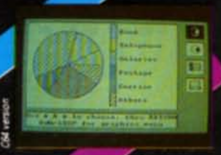
DATABASE: Build a versatile card index, do powerful multi-field sorting, use the flexible printout routine, perform all arithmetic functions and link with the word processor.


Amstrad version

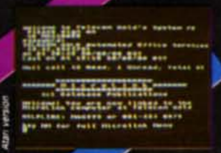
SPREADSHEET: Prepare budgets and tables, total columns and rows with ease, copy formulae absolutely or relatively, and recalculate automatically.


Amstrad version

LABEL PRINTER: Design the layout of a label, select any label size and sheet format, read in files from the database module and print out in any quantity.


C64 version

GRAPHICS: Produce pie charts, overlay line graphs and display bar charts side by side or stacked. Enter data directly or load data from the spreadsheet.


Atari version

COMMUNICATIONS: Access services such as MicroLink and Telecom Gold, send electronic mail, telex, fax and tele-messages in a flash or order a wide range of goods.

PRINTER BUFFERS AND DATA SWITCHES

MANUAL DATA SWITCHES (Metal case, Long life Rotary Switches)

Parallel Centronics 2-way	£21.00
Parallel Centronics 3-way	£25.00
Parallel Centronics 4-way	£30.00
Parallel Centronics X-over	£30.00

Serial RS232 2-way	£19.50
Serial RS232 3-way	£24.00
Serial RS232 4-way	£28.00
Serial RS232 X-over	£28.00

AUTO SWITCHES

(Automatic Switching, form feed, select, metal case)

Parallel Centronics 4 to 1	£75.00
Parallel Centronics 8 to 1	£96.00
Serial RS232 4 to 1	£80.00

PRINTER BUFFERS

(Functions: Copy, Bypass, Selftest, Reset, Port Selectable)

Parallel only available

64K 1 input to 1 output	£70.00
64K 2 input to 1 output	£90.00
256K 1 input to 1 output	£140.00
256K 2 input to 1 output	£160.00
256K 4 input to 2 output	£256.00

CABLES 2mtr (screened core)

m-Male – f-Female

25m to 36m IBM type	£7.95
25m to 25m RS232	£7.95
25m to 25f RS232	£7.95
36m to 36m centronic	£8.50

GENDER CHANGERS

25 way f to 25 way f	£5.25
25 way m to 36 way f	£7.50
25 way m to 9 way f	£7.50
25 way f to 9 way m	£7.50

ACCESSORIES

25 way minitester m/f	£10.50
25 way Jumper Box m/f	£8.50
25 way Null Modem m/f	£5.25

MULTI PORT GENDERS 25 WAY

1 female and 3 male	£9.50
2 female and 2 male	£9.50
3 female and 1 male	£9.50

3½"

DS/DD 135TPI
100% Certified
Lifetime Guarantee

BENCHMARK BRANDED

10	£12
20	£20
50	£44
100	£84
200	£160
500	£398

5¼"

DS/DD 96/48TPI
100% Certified
Lifetime Guarantee

BENCHMARK BRANDED

25	£11
50	£20
100	£36
200	£70
500	£170
1000	£300

DISK BOXES (Lockable inc. 2 keys and dividers)

3.5" 40 capacity	£6.25
3.5" 80 capacity	£7.25
3.5" 100 capacity	£8.25
5.25" 50 capacity	£6.25
5.25" 100 capacity	£7.25
5.25" 140 capacity	£8.25

3.5" BOX AND BENCHMARK DISKS OFFER

20 3.5" DS/DD 135 TPI Disks plus 40 capacity box	£24.00
40 3.5" DS/DD 135 TPI Disks plus 40 capacity box	£38.00
50 3.5" DS/DD 135 TPI Disks plus 80 capacity box	£48.00

All boxes have lock and two keys

5.25" BOX AND BENCHMARK DISKS OFFER

25 5.25" DS/DD 96/48 TPI Disks plus 100 cap. box	£16.00
50 5.25" DS/DD 96/48 TPI Disks plus 100 cap. box	£24.00
100 5.25" DS/DD 96/48 TPI Disks plus 100 cap. box	£40.00

All boxes have lock and two keys

MONITOR + KEYBOARD ARM

Supports up to 65lb. Supplied with desk, clamp and wall mounting.

Model No. ATM601	£95.00

SPACE SAVER PRINTER STAND

YU – S25A 80 Col	£25.00
YU – S25B 132 Col	£29.00

ALL PRICES INCLUDE VAT & P&P. UK & BFPO ORDERS ONLY

M
C
S

Cheques & Postal Orders to:-

24 Hour Orderline: 0597 87 784

Manor Court Supplies Ltd

Telephone: 0597 87 792

DEPT MU6, GLEN CELYN HOUSE, PENYBONT, LLANDRINDOD WELLS, POWYS, LD1 5SY

EDUCATION AND GOVERNMENT ORDERS WELCOME

£10 Prize letter

IT'S ALL GREEK TO THE PRINTER

IT is volume 7 of The Micro User *already. How time flies. It seems like only yesterday I was excitedly thumbing the pages of the first issue. Congratulations on keeping up the interest.*

My BBC Micro is mainly used for word processing nowadays and recently I moved from Wordwise Plus to Interword. The wysiwyg features are splendid, although correcting the text over embedded commands is an adventurous pastime and can sometimes result in strange effects.

But this is more than compensated for by the ease with which long embedded commands can be used.

Recently I had to write an article for camera-ready copy in Elite text and with daisywheel quality. This would not have mattered except that the text contained a large sprinkling of Greek characters not present on my Juki 6100.

Even if I had possessed a Greek daisywheel the 30 or more changes needed while printing would have tried the patience of a saint.

My solution uses printer codes – particularly the 120th inch backspace – to create passable Greek characters by combining ones already on the daisywheel.

The ∝ is achieved by backspacing the letter c 4/120in on to the letter o. The △ is a > and / combined and is backspaced 1/120 inch overall to leave a little space before the following character. The ß is a complex character based on the degree symbol – code 96 – and here o has to be backspaced twice plus 7/120 inch.

The command is lengthy and divided into two in order to overcome the size limitation of the Interword window. This necessitates the addition of an extra backspace – code 8 – in the second half of the command. For repeat usage of the codes in your text employ markers and Copy.

The actual commands are:

```
∝ o(27,8,27,8,27,8,27,8)c

ß (96,8,27,8,27,8,27,8,27,
  8)/ ##(8,27,8,27,8,27,8,
  27,8)#(8,8,27,8,27,8)o

△ (27,8,)>(8,27,8)/
```

Note that each block in brackets represents one f2 embedded command in Interword – do not type in the brackets. There is no comma after the last digit and spaces are shown as #. Also, printer DIP switches 4,5 and 6 must be set to off – USA setting – or different characters will be obtained.

The Harald Elite 10/12 daisywheel also has △ – shift 6 – rather than a circumflex, ˆ which can be output using code 27,90 and Ω – code 92. Coded characters occupy space not included in the justification of text or the preview mode.

To realign a justified line add to the end of the line one pad character for each occurrence of µ or Ω but, unfortunately, ß or △ will not justify.

Juki printer commands appear to be standard for Epson and Brother daisywheel machines but the location of special characters on the wheel can vary.

It is well worth inspecting your wheels with a magnifying glass and then working out how to print any unusual characters – you could be in for a surprise.

Finally, Wordwise Plus users should replace 27, – note the comma – by ES and press f1 instead of other commas. For example, to print ± which is vital for tabulating statistical data use:

```
+(8,27,85)-(27,68)
```

for Interword and:

```
+<f1>0C8<f1>ES85<f2>-<f1>ES68<f2>
```

for Wordwise Plus. Happy printing. – **Dr David Watts, Barnet, Herts.**

Win a tenner

● **Want to write to The Micro User? The address is: Letters, The Micro User, Europa House, Adlington Park, Adlington, Macclesfield SK10 4NP.**

Writers of the most interesting letters receive a £10 prize.

Left in the dark

WHEN I had difficulty in following the programs given in the instruction book for my printer I wrote to the supplier for further advice.

Their response was that the book provided the standard type that all printer manufacturers issue and contains details and examples written in Microsoft Basic – the most popular Basic language in the world. But, at additional cost, they could supply a bettter, BBC Micro-specific book.

Is this normal? It seems to me that having bought a set of equipment the instructions should be inter-related without further expense.

I am also surprised to notice the surcharge on discs – particularly 3.5in ones. Why is this? It cannot be the price of the blank discs, since the difference between them and tapes is minimal and this should be more than compensated for by the speed of copying.

The difference in price between sizes of disc is also difficult to understand. – **T.D. Dore, Preston, Lancs.**

● We agree that most printer manuals are very poor and usually written in general terms to suit all micros. If anyone has had a good manual supplied free with their printer we'd like to hear about it.

The cost of any product depends not only on the price of the raw materials but also on supply and demand.

The time it takes to copy an average length tape commercially is, in fact, not much different to the disc duplication time – but the cost of both comes down as more are ordered from duplicators.

Strictly for the birds

I AM a keen birdwatcher and anxious to put my records on a micro. Is a suitable program available? – **Sheila Hall, Staines, Middlesex.**

● Bird Spy from BBC Soft will probably suit your needs.

Dumpout problems

I HAVE just bought a Panasonic KX-P1081 printer together with Dumpout 3. I've done some marvellous printouts using the chip straight, but The Micro User *Dumpout Encoder in the August 1988 issue clearly simplifies matters – or should do.*

Get it Right! shows that the

Turn to Page 130 ▶

◀ *From Page 129*

typing is correct, but there is a snag which I am unable to rectify. Having entered the chosen specifications and called Dump Screen the interaction goes as follows:

```
"What is the name of th
e file?" WOOLBAL
"What mode is it?" 1
"Do you want to dump an
other?"
```

If the answer is Y, I am again asked for the name of the file and so on. If I answer N the program finishes. How can I break out of this circle and get a printout? – **Leslie Gardener, Farnham, Surrey.**

● You must be selecting a key or switch-triggered option. These should only be used if you want to print out the command to use yourself. To use the program to dump a screen saved on disc don't set either.

Archie and Domesday

CAN you tell me what modifications I would need to make to my Archimedes 310 to enable it to run the Domesday project? – **K. McAlpine, Brisbane Glen, Largs.**

● That's quite a tall order and, as far as we know there's no package available to do it. What you would need is a Philips laser disc player – not a CD player – some sort of hardware interface plus the controlling software.

ALL programs printed in this magazine are exact reproduction of listings taken from running programs which have been thoroughly tested.

However, on the rare occasions when mistakes occur corrections are published as a matter of urgency. Should you encounter error messages when you type in a program, they will almost certainly be the result of your own typing mistakes.

Unfortunately we can no longer answer personal programming queries concerning these mistakes. Of course letters about suggested errors will be investigated without delay, but any replies found necessary will only appear in the letters pages.

Ten for T? No problem

I ENJOY playing card game simulations, and Orthogonal Patience in your March issue was a very nice example. But I hate the use of T for 10 in the display. Fortunately, this can easily be avoided by the following simple amendment to the program.

Change line 200 to the following and add line 1381:

```
  200 n$="A23456789"+CHR
$152+"JQK"
  1381 VDU23,152,&CE,&DB
,&DB,&DB,&DB,&DB,&CE,0
```

A similar amendment will work with most similar simulations using Mode 1. – **Albert Gardner, High Wycombe, Bucks.**

The word from Warsaw

I WOULD like to point out that there are several BBC Micro users here in Poland. Last year we organised a club with about 20 members in Warsaw. We possess various kinds of Acorn machines including Electrons, BBC Bs, Compacts and Masters.

As BBC Micros are quite rare in Poland they are absolutely ignored by our local magazines, so we are always anxious to hear news about them.

We would like to set up a regular correspondence with any BBC Micro users who would write to us. We intend to exchange our knowledge, experiences and programs. –
Piotr Pagowski, ul Perzynskiego 13/70, 01-855 Warsaw, Poland.

Speeding dumps

I HAVE recently bought a Panasonic KX-P1081 printer and am very pleased with it. I do a lot of graphics work but all the screen dump programs that I have are very slow.

The one in the graphics part of Mini Office is quite fast – please could you supply a listing for this, or provide a similar one? – **Stuart Smith, Combe, Oxon.**

● The routine in Mini Office is basically the same as the one published in the January 1984 issue of *The Micro User*. However, you'd have much more flexibility for screen dumps if you fitted a rom like Dumpmaster by Technomatics, Dumpout 3 from Watford Electronics or Printmaster from Beebug.

Check on checksums

I GET The Micro User *every month and I think it is great. I often type in the programs: Could you please tell me how Get it Right! works?* – **Dr. R.J. White, via Prestel.**

● The way to use the checksums was last published in our February issue. To save you typing it in, the program is on our monthly discs and tapes, which are now free to subscribers. To use them, with the disc or tape ready, just type:

```
*RUN XS
```

A list of checksums for the Basic program at present in memory will be displayed for you to compare with those printed.

The first four digits refer to the line they correspond to while the final one is a total so that if you've gone wrong you can quickly find out where.

Emulation for most of the time

I HAVE a BBC B Issue 7 with an Integra-B expansion board that came with an Integra-B 1.12 OS that you need to make it emulate a B+ or Master. I also have an AMX Super Rom and an Acorn DFS.

Every time I want to use the enhanced version of Repton – which has the editor loaded into sideways ram – pressing Break just makes the screen go funny and it doesn't work. But the enhanced version of Crazee Rider works perfectly. – **Neal Pinder-Packard, New Whittington, Chesterfield.**

● We are currently testing the Integra-B board for a review and have found similar problems. What it comes down to is that Master emulation is still just emulation and cannot be perfect. If an enhanced version works then it's good – but there's no guarantees.

To improve the emulation capabilities it could be worthwhile replacing the 6502 chip with a 65C02 with the enhanced instruction set which some enhanced games need.

Failed backups

I RAN the Auto Archiving program from your August 1988 monthly disc and got the $ range error. I've checked it against the magazine checksums and they match, so what could be wrong?

I have several utility roms including Disc Doctor, which often interferes with other programs, but removing it didn't help. I'd be grateful if you could tell me what is wrong as the program is one I would like to make use of. – **Alex Savvides, Southgate, London.**

● The program as provided on the disc and in the magazine is configured for the model B. As you don't specify which machine you're using, is it different? In that case just adjust line 130 as appropriate.

Also it's not clear whether the *$ range* error occurs when you assemble the machine code or actually try to use it. If it's the latter this increases the probability that you're assembling the wrong version.

There's also a chance that, as the star commands used by the routine are abbreviated, your utility roms are intercepting them. For example *REN. may be intercepted by Toolkit as *RENUMBER rather than the correct *RENAME. You could try extending lines 1810 to 1840 to:

```
1810 OPT FNs("DRIVE ")
1820 OPT FNs("DIR ")
1830 OPT FNs("DELETE ")
1840 OPT FNs("RENAME ")
```

Two Beebs are better than one

£10 Prize letter

A LETTER in Mike Cook's problem page in your January issue – from a reader with a spare Electron – made me to wonder what could be done with a spare model B and what I came up with may be of use to other readers.

The two micros may be connected together using a standard RS423 cable and one can then operate solely in Mode 7 – retaining a large amount of free memory – while the other creates a high resolution screen display.

Alternatively, if both micros have monitors, one program can address both screens using any combination of modes.

*The procedure is very simple. The slave micro runs Program I which simply sends any incoming codes to the screen. The other requires only a *FX3,7 command to freeze it's own display and activate the slave. A *FX3 will halt the slave's display and re-enable its own one.*

Program II demonstrates the idea by drawing random triangles in Mode 2 on the slave, while displaying the corresponding Plot codes in Mode 7 on its own screen.

*Both micros must have the same baud rate set – using *FX7 and *FX8 – and remember that there is a time delay which can clearly be seen by pressing Escape while Program II is running.*

Unfortunately all this does not help with the spare Electron as it has no RS423 port. – **Nigel Barrett, Prescot, Merseyside.**

```
10 REM RS423 Receiver
20 *FX7,6
30 *FX8,6
40 *FX4,1
50 REPEAT
60 VDU GET
70 UNTIL FALSE
```

Program I: The receiver

```
 10 REM RS423 Sender
 20 ON ERROR GOTO180
 30 *FX7,6
 40 *FX8,6
 50 *FX3,7
 60 VDU22,2:REM Mode 2
 70 REM Not MODE else
 80 REM HIMEM changes
 90 REPEAT C=RND(7)
100 X%=RND(1280)-1
110 Y%=RND(1024)-1
120 *FX3,7
130 GCOL0,C%
140 PLOT85,X%,Y%
150 *FX3
160 PRINT"GCOL0,";C%":P
LOT85,";X%",";Y%
170 UNTIL FALSE
180 VDU0;0;0;0;:*FX3
190 REPORT:PRINT" at li
ne ";ERL
200 END
```

Program II: Demo sender

Your work in print

COULD you please let me know the procedure for supplying programs or articles to The Micro User? I would also like to know if they are paid for. – **Owen Astleyu, Durham.**

● We always welcome features and programs – just send them to the address on the contents page of the magazine.

Programs must be on disc or tape – preferably the former – and it helps us if the word processor file of an article is also supplied. If we accept your work, we will pay you when it is published.

Talking heads

IN your March issue J. Parsons of County Durham said the cost of a print head for a Juki 5500 was about £200.

I'd just like to say that Denham Computer Products can supply it for £155.25 – **P. Denham, Denham Computer Products, Basingstoke (0256 64752).**

Basic cursor commands

I AM writing a program in BBC Basic and have come across a couple of problems. Using VDU23;8202;0;0;0; switches off the cursor, but is there a code to turn it back on without changing mode? Also is there a code to turn on and off the question mark that appears at the INPUT statement? – **I.G. Clough, Netheringham, Lincs.**

● The cursor can be switched back on using:

```
VDU23;29194;0;0;0;
```

However, it's better to use:

```
VDU23,1,0;0;0;0;
```

for off and

```
VDU23,1,1;0;0;0;
```

for on.

The question mark only appears if you have no print string as part of the INPUT statement or if the string is followed by a comma or semicolon (the latter should always be avoided as it only works on Basic 1).

Here's a demonstration program of four INPUT statements – two with and two without question marks:

```
10 INPUT"What is your n
ame",name$
20 INPUT"Enter your nam
e:"name$
30 INPUTname$
40 INPUT""name$
```

Quotation missing

IN the Block Breaker listing in your April issue line 750 should have a quotation mark at the end. The checksums, however, were made with one there, so typing the listing as it is printed results in incorrect checksums. Thanks for a great game. – **Daniel Wagenaar, Amsterdam, Holland.**

● We're sorry the quotation mark was missing. As with all our programs, Block Breaker was listed directly from a BBC Micro, but unfortunately, the character *fell off* the line during one of the printing processes.

Identification parade

IS there a short routine to identify which micro a program is running on? – **Thomas McGowan, Sheffield.**

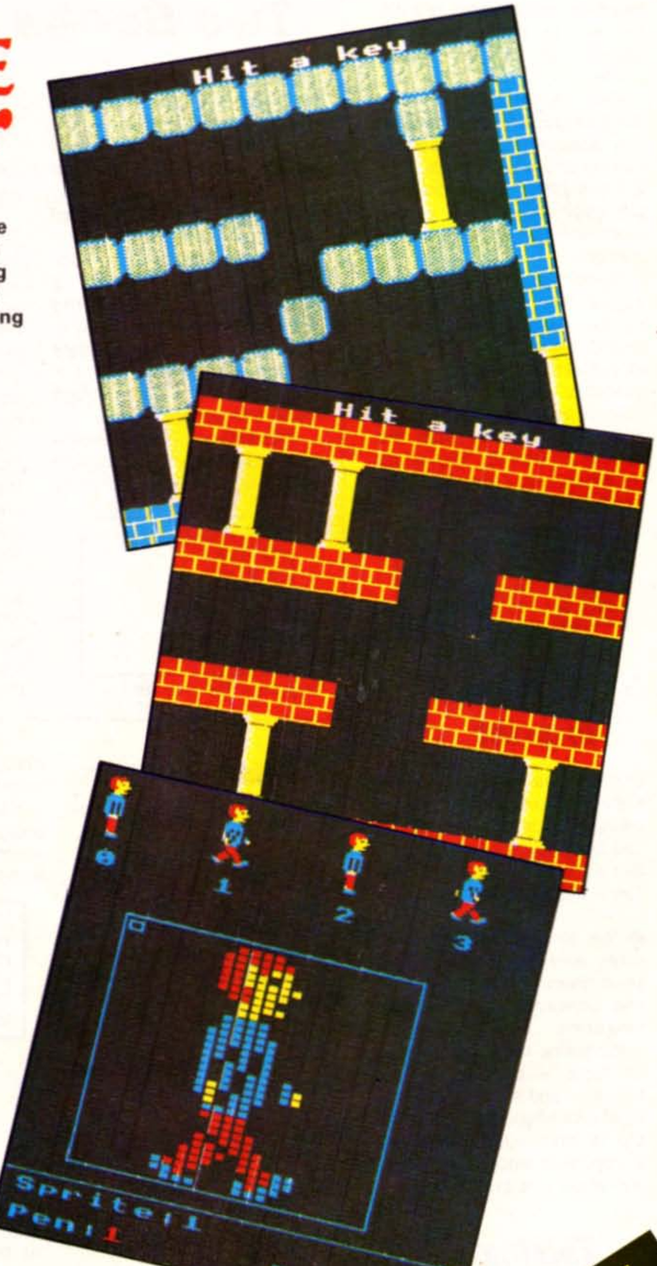
● Identifying the current machine is easy using INKEY-256 which returns different values for different operating systems:

Value	OS
–1	OS 1.20
0	OS 0.10
1	Electron
251	B+
252	German OS
253	Master
254	US OS
245	Compact
160	Arthur
161	Risc OS

There is a full set of routines to find the micro, version of Basic and which filing system is in use in our June 1988 Letters.

Write your own arcade smashes using the

ARCADE GAME *Creator*



Screens designed using Arcade Game Creator

Arcade Game Creator is a suite of programs for the Electron and BBC Micros. Taken from the pages of *Electron User,* it lets you into the secrets of writing fast-action arcade games, and provides you with a number of utilities to make design and programming easier.

Among the programs are:

- A Mode 5 sprite editor that lets you design your own multi-coloured characters.
- A selection of fast print routines that will move sprites both in front or behind other objects on the screen.
- Map generators that will squeeze a Mode 5 screen into 8 bytes!
- Scrolling maps.
- Score update and printing routines.

. . . and much, much more.

To help you make the most of the Arcade Game Creator, you will also get a comprehensive manual based on the original series.

Written in an easy to read style and with many illustrations and screen shots, it contains all the information you need to create and animate sprites, to design backgrounds and to link the two together into a complete arcade game.

If you are an aspiring games programmer, this is an offer you simply cannot afford to miss!

Arcade Game Creator	
Tape + manual	**£9.95**
Disc + manual	**£11.95**

TO ORDER PLEASE USE THE FORM ON PAGE 135

SAVE up to £84!

How's this for an incredible deal?

THE MICRO USER
December 1988
Fruits 40T
Code 2653
(c)Database Publications
THE MICRO USER
NOVEMBER 1988
OCTOBER 1988
DECEMBER 1988
PLAY BOTH SIDES

THE MICRO USER and monthly tape

Usual price	*£53*
Offer price	**£23**

THE MICRO USER and monthly 5.25in disc

Usual price	*£68*
Offer price	**£23**

THE MICRO USER and monthly 3.5in disc

Usual price	£111
Offer price	**£27**

(inc P&P. UK offer only)

Subscribe to *The Micro User* for a year – and we'll send you the accompanying tape or disc every month!

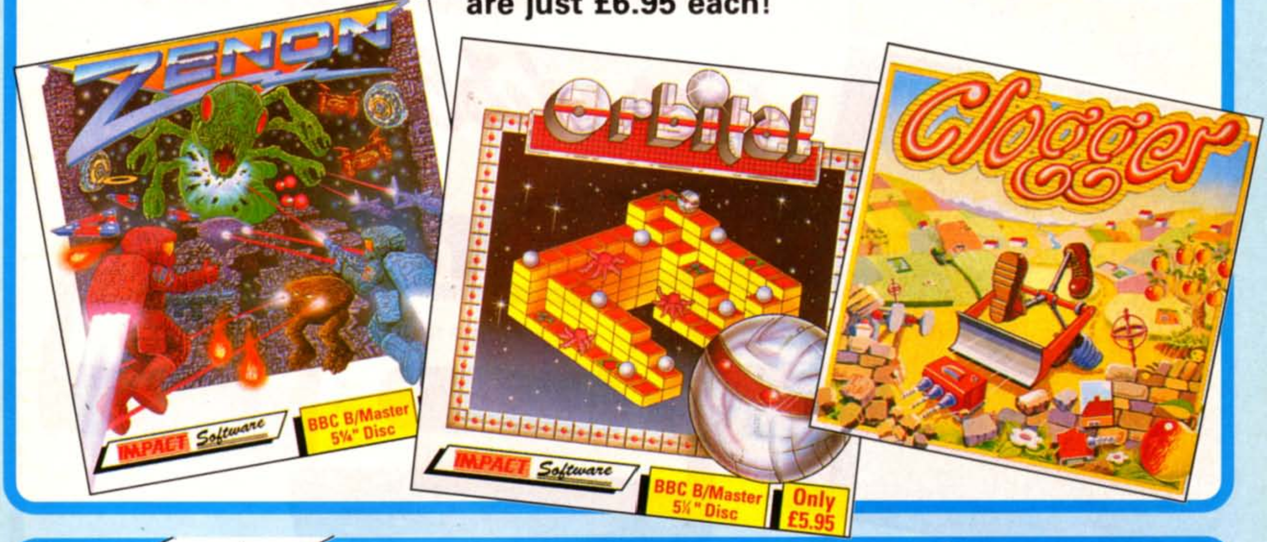
That's right, our tapes and discs have proved so popular we've decided to make them available to EVERYONE who subscribes. And that adds up to a massive saving of £84 with the monthly 3.5in discs!

Just think, not only will you get your favourite magazine delivered to your door before it's on sale in the newsagents, you'll also get a tape or disc each month containing all the listings from that issue – plus the occasional extra.

So, subscribe today and as well as ensuring you get The Micro User *each month, with the monthly tapes or discs you'll save the wear and tear on your fingers, and get programs that work correctly – the first time!*

Subscribe today, using the form on Page 135

Here's your chance to get your hands on Impact's best selling games. For just £4.95 you can have either the tape or 5.25″ disc of Zenon, Clogger or Orbital. Or if you have a Master Compact they are just £6.95 each!



Top selling software from Impact!

Cheat it Again, Joe

Volume 3 available now

CONGRATULATIONS YOU ARE NOW ELITE

Tape £2.99 *each volume*

5¼" disc £4.99 *each volume*

The cheats

Just about all the games in your collection can now be cracked – using Cheat it Again, Joe!

Each tape or disc contains a massive 20 cheats and they're so easy to use. Just load the cheat before you run the game and you're away – with infinite lives, extra speed, more credits, invulnerability and so on.

Now you can complete those games that have been frustrating you for months.

And for only £2.99 on tape or £4.99 on disc, this is the ideal way to bring your games collection back to life.

Volume 1

5¼" disc		Tape	
Elite	Bonecruncher	Elite	Bonecruncher
Citadel	XOR	Citadel	Killer Gorilla
Ravenskull	Elixir	Ravenskull	Elixir
Thrust	Living Daylights	Thrust	Living Daylights
Plan B	Deathstar	Strykers Run	Deathstar
Repton 1	Starship Command	Repton 1	Starship Command
Repton 2	Arcadians	Repton 2	Arcadians
Star Wars	Kourtyard	Star Wars	Kourtyard
Quest	Despatch Rider	Quest	Despatch Rider
Thunderstruck 2	Phantom	Thunderstruck 2	Phantom

Volume 2

5¼" disc		Tape	
Repton 3	Palace of Magic	Repton 3	Palace of Magic
Around the World	Icanus	Around the World	Icanus
Life of Repton	Impact	Life of Repton	Impact
Galaforce	Magic Mushrooms	Plan B2	Magic Mushrooms
Codename: Droid	Planetoid	Codename: Droid	Planetoid
Crazee Rider	Ransack	Combat Lynx	Ransack
Paperboy	Imogen	Paperboy	Imogen
Siagon	Uridium	Siagon	Uridium
Spycat	Karate Combat	Spycat	Karate Combat
Spellbinder	Repton 3 passwords	Spellbinder	Repton 3 passwords

Volume 3

5¼" disc		Tape	
Clogger	Starquake	Repton Thru Time	Arkanoid
Repton Tru Time	Spitfire '40	Shark	Spitfire '40
Shark	Ziggy	Empire Strikes Back	Ziggy
Empire Strikes Back	Big KO	Grand Prix Cons. Set	Big KO
Grand Prix Cons. Set	Omega Orb	Barbarian	Omega Orb
Skirmish	Future Shock	Breakthrough	Future Shock
Barbarian	Krakout	Sentinel	Krakout
Breakthrough	Meteors	Firetrack	Meteors
Cholo	Rocket Raid	Anarchy Zone	Thunderstruck
Sentinel	Labyrinth	Frankenstein 2000	Creepy Cave

Place your order today, using the form on page 135

THE MICRO USER ORDER FORM

MAIL ORDER OFFERS

Please allow up to 28 days for delivery

Valid until June 30, 1989

Annual subscription (incl. tape or disc)

NEW

(See page 133)

		New *	☐	Renewal	☐	£ p
Magazine + monthly tape	£23	*2225*	☐	*2226*	☐	
Magazine + monthly (40 track) 5.25"disc	£23	*2227*	☐	*2228*	☐	
Magazine + monthly (80 track) 5.25" disc	£23	*2251*	☐	*2252*	☐	
Magazine + monthly 3.5" disc	£27	*2234*	☐	*2235*	☐	____
Europe & Eire: Surface	£28	*2365*	☐	*2114*	☐	
Overseas: Surface	£34	*2366*	☐	*2367*	☐	
Overseas: Air	£45	*2004*	☐	*2113*	☐	____

* New subscriptions commence with next issue

Impact Software Special Offer

NEW

(See opposite)

Clogger tape	£4.95	*2259*	☐
Clogger 5.25" disc (BBC B)	£4.95	*2195*	☐
Clogger 3.5" disc (Compact)	£6.95	*2196*	☐
Zenon tape	£4.95	*2260*	☐
Zenon 5.25" disc (BBC B)	£4.95	*2261*	☐
Zenon 3.5" disc (Compact)	£6.95	*2262*	☐
Orbital tape	£4.95	*2263*	☐
Orbital tape 5.25" disc (BBC B)	£4.95	*2264*	☐
Orbital tape 3.5" disc (Compact)	£6.95	*2265*	☐
Cheat it again, Joe Vol 1 cassette	£2.99	*2197*	☐
Cheat it again, Joe Vol 1 5.25" disc	£4.99	*2198*	☐
Cheat it again, Joe Vol 2 cassette	£2.99	*2199*	☐
Cheat it again, Joe Vol 2 5.25" disc	£4.99	*2223*	☐
Cheat it again, Joe Vol 3 cassette	£2.99	*2266*	☐
Cheat it again, Joe Vol 3 5.25" disc	£4.99	*2267*	☐

Arcade Game Creator (DFS only)

(See page 132)

Cassette & Manual	£9.95	*2268*	☐
5.25" disc (40T) & Manual	£11.95	*2269*	☐
5.25" (80T) & Manual	£11.95	*2270*	☐

Add £2 for Europe & Eire /£5 Overseas

DTP Yearbook *(See page 44)*

NEW

	£9.95	*0505*	☐

Add £2 for Europe & Eire/£5 Overseas

Electron Books *(See page 11)*

	£7.95	*3061*	☐

Add £3 for Europe & Eire/£5 Overseas

Electron Educational bundle *(See page 60)*

NEW

Tape only	£9.95	*3084*	☐

Add £3 for Europe & Eire/£7 Overseas

Mini Office II

(See page 127)

Available For:	MO2	Book	Example Disc	Price	Code	Please Tick
Tape users	●	–	–	£14.95	*2368*	☐
Model B, B+ (40T disc)	●	–	–	£16.95	*2369*	☐
Model B, B+ (80T disc)	●	–	–	£16.95	*2370*	☐
Master (5.25" 40T disc)	●	–	–	£19.95	*2283*	☐
Master (5.25" 80T disc)	●	–	–	£19.95	*2028*	☐
Tape users	●	●	–	£19.95	*2271*	☐
Model B, B+ (40T disc)	●	●	–	£21.95	*2272*	☐
Model B, B+ (80T disc)	●	●	–	£21.95	*2273*	☐
Master (5.25" 40T disc)	●	●	–	£24.95	*2281*	☐
Master (5.25" 80T disc)	●	●	–	£24.95	*2276*	☐
Model B, B+ (40T disc)	●	●	●	£29.95	*2274*	☐
Model B, B+ (80T disc)	●	●	●	£29.95	*2275*	☐
Master (5.25" 40T disc)	●	●	●	£32.95	*2282*	☐
Master (5.25" 80T disc)	●	●	●	£32.95	*2277*	☐

Books

The Complete BBC Computer User Handbook	£14.95	*2163*	☐
The Advanced Reference Manual for the BBC Master	£16.95	*2164*	☐

Add £2 per book for Europe and Eire, £5 for Overseas

Forth Rom

£19.95	*2046*	☐

Add £4 per Rom for Europe & Eire £15 Overseas

Time & Magik *(See page 114)*

80T disc	£14.95	*2160*	☐

Add £2 for Europe & Eire/£4 Overseas

Fun School 2 (DFS only)

(See page 52)

		Tape £9.95	5.25" disc (40/80T) £12.95
Under 6s	*2239/40*	☐	☐
6-8 year olds	*2242/43*	☐	☐
Over 8s	*2245/49*	☐	☐

Add £2 for Europe & Eire/£4 Overseas

Morley Teletext Adapter *(see page 42)*

Teletext Adapter (40T utilities disc) + Design 7 Plus	£99.95	*2157*	☐
Teletext Adapter (80T utilities disc) + Design 7 Plus	£99.95	*2158*	☐
Power Supply	£9.95	*2054*	☐

Add £4 for Europe and Eire, £7 for Overseas

Ten of the Best Educational programs

(DFS only) *(see page 63)*

Cassette	£5.95	*2189*	☐
5.25" Disc (40T)	£6.95	*2190*	☐
5.25" Disc (80T)	£6.95	*2191*	☐

Lancelot *(See page 86)*

BBC Master disc	£14.95	*2192*	☐

Add £2 for Europe & Eire/£4 Overseas

➡ ➡ ➡ ➡ ➡ ➡ ➡ ➡ ➡ **TOTAL** ____

Payment: please indicate method (✓)

☐ Cheque/Eurocheque made payable to Database Publications Ltd.

☐ Access/Mastercard/Eurocard/Barclaycard/Visa Expiry Date ___ / ___

No. ☐☐☐☐ ☐☐☐☐ ☐☐☐☐ ☐☐☐☐

Name ____________________ Signed ____________________

Address ____________________

____________________ Postcode ____________________

Daytime telephone number in case of queries ____________________ MU6

Send to:
Database Direct
FREEPOST, Ellesmere Port,
South Wirral L65 3EB
(No stamp needed if posted in UK)
Please allow up to 28 days for delivery

Order at any time of the day or night

Tel: 051-357 2961

Fax Orders:	*Orders by Prestel:*	*MicroLink/Telecom Gold*
051-357 2813	Key *89, then 614568383	72:MAG001

Don't forget to give your name, address and credit card number

EPROMS, 8271

	Ex VAT	Inc VAT
1-9 27128 250nS 21V	5.00	5.75
10+ 27128 250nS 21V	4.40	5.06
1-9 27128 250nS 12.5V	3.22	3.70
10+27128 250nS 12.5V	2.91	3.35
1-9 2764 250nS	2.77	3.19
1-9 27256 250nS	4.80	5.52
1-9 TTL/Cmos set	3.91	4.50
1-9 8271 controller	38.26	44.00
10+ 8271 controller	34.00	39.10
1-9 6264 LP 150nS	6.00	6.90
Acorn 8271 DFS	45.22	52.00
Acorn 1770 DFS	45.22	52.00

ROMS

	Ex VAT	Inc VAT
Inter-Word	35.65	41.00
Inter-Sheet	35.65	41.00
Inter-Base	46.96	54.00
Wordwise Plus	37.39	43.00
MEGA 3	71.30	82.00
Spell Master	40.00	46.00
View Spell	26.00	29.90
View Plot Disc	19.13	22.00
Viewsheet	35.65	41.00
ViewStore	35.65	41.00
OverView I & II	68.70	79.00
View Professional	58.26	67.00

MONITORS

	Ex VAT	Inc VAT
Philips CM8802	173.04	199.00
Philips CM8852	251.30	289.00
Philips BM7502 Green	65.22	75.00
Philips BM7522 Amber	73.91	85.00
Philips BM Stand	7.78	8.95
Philips TV Tuner	56.52	65.00
Taxan KX Amber	82.61	95.00
Taxan KX1201 Green	68.69	79.00
Microvitec 1451	221.74	255.00

(Prices inc. BBC Cable)

MASTER/ARCH

	Ex VAT	Inc VAT
Master 128K Micro	346.95	399.00
Archimedes 305 from	599.13	689.00
Master Compacts from	294.78	339.00
Turbo Upgrade	98.78	113.50
Peatree MR8000 64K ram	47.83	55.00
A.R.M. Ass. Lang. Book	12.00	12.00
Master Cartridges from	8.65	9.95
Reference Manuals	14.00	14.00
View 3/View Sheet Guides	9.00	9.00
Master & B Dust Covers	3.00	3.45
Second user BBC B's available	Phone	

Philips CM8833

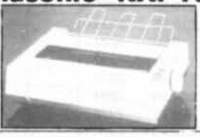
with BBC cable

£225.00 (£195.65+VAT)

VOLTMACE JOYSTICKS

Delta 14B single	12.61	14.50
Delta 3B single	11.26	12.95
Delta 3B twin	17.35	19.95

Panasonic KXP1081



with BBC cable & paper

£155.00 (£134.78+VAT)

with Screen Dump, 2m cable + paper

£160.00 (£139.13+VAT)

	Exc VAT	Inc VAT
KXP Fabric ink ribbon	3.74	4.30
KXP View Printer Driver	7.83	9.00
KXP Control/Dump Rom	13.00	14.95

PANASONIC KXP1180

with BBC cable & paper

£179.00 (£155.65+VAT)

PANASONIC KXP1124

(24 Pin)

with BBC cable & paper

£299.00 (£260.00+VAT)

CITIZEN 180E

with BBC cable & paper

£158.00 (£137.39+VAT)

Taxan KP815

With BBC cable & paper

£175.00 (£152.17 + VAT)

CITIZEN 120D

with BBC cable & paper

£135.00 (£117.39+VAT)

CANON PW1080A

with BBC cable & paper

£159.00 (£138.26 + VAT)

STAR LC10

with BBC cable & paper

£189.00 (£164.35+VAT)

EPSON LX 800

With BBC cable & paper

£179.00 (£155.65 + VAT)

STAR LC10 Colour

with BBC cable & paper

£239.00 (£207.83+VAT)

EPSON LQ500

With BBC cable & paper

£315.00 (£273.91 + VAT)

STAR LC2410

with BBC cable & paper

£315.00 (£273.91+VAT)

PRINTERS/CABLES/Etc.

	Ex VAT	Inc VAT
Canon A55 (17"w)	260.00	299.00
Epson LQ850	465.22	535.00
Citizen MSP15E (15"w)	247.83	285.00
Star NX15 (15"w)	294.78	339.00
1.5m (4 foot) BBC cable	4.00	4.60
2.0m (6 foot) BBC cable	6.00	6.90
Compact printer cable	6.00	6.90
IBM/Archimedes cable	6.00	6.90
LX/LQ Sheet Feeder	62.61	72.00
LC10/LC2410 Sheet Feeder	51.30	59.00
2 way Printer Switch	18.00	20.70
Printer Dust Covers	4.00	4.60

PRINTER RIBBONS

	Ex VAT	Inc VAT
LX800 & FX800 Print Ribbon	2.30	2.65
LX80 Print Ribbon	2.13	2.45
LC10 Print Ribbon	4.00	4.60
NL-10 Print Ribbon	4.80	5.52
120D Print Ribbon	4.00	4.60
Taxan/Canon Ribbon	3.22	3.70
Juki 6100 Print Ribbon	1.30	1.50

Phone for quality discounts

DISKETTES (100% Error free)

(lifetime warranty)	Ex VAT	Inc VAT
10 Banana Reversible	8.65	9.95
10 3.5" D/S 135tpi	7.39	8.50
50 3.5" D/S 135tpi	34.80	40.00
100 3.5" D/S 135tpi	67.83	78.00
10 96tpi D/S D/D in box	5.17	5.95
50 96tpi D/S D/D in boxes	17.17	19.75
100 96tpi D/S D/D in boxes	32.09	36.90
50 Disc Box 3.5" + lock	5.17	5.95
50 Disc Box hinged + lock	5.65	6.50
100 Disc Box hinged+ lock	6.52	7.50

5¼ DISC DRIVES

	ExVAT	InVAT
Cumana CSX100 40T	74.78	86.00
Cumana CSX400 40/80T	89.57	103.00
Cumana CDX 800S 40/80T	175.65	202.00
Cumana CD800S 40/80T	195.65	225.00
MD400A 400k No PSU 40/80T	85.22	98.00
MD400B 400k & PSU 40/80T	95.65	110.00
MD802C 800k No PSU 40/80T	160.87	185.00
MD802E 800k & PSU 40/80T	179.13	206.00
MD802D 800k & stand 40/80T	204.35	235.00

Phone for Winchesters & Torch

Phone for our best price before placing your order

EDUCATIONAL & GOVERNMENT ORDERS WELCOME

All products have a 12 month no quibble guarantee
Prices subject to variation without prior notification
We are closed Saturday afternoons
Carriage 92p (80p + VAT) Securicor £6.90 (£6.00 + VAT)

WeServe

Larger items delivered by Securicor

Micro Dept.
128 West Street,
Portchester,
Hants.
PO16 9XE
Tel: 0705 325354

EUROWORD

for WORDWISE and WORDWISE PLUS

Converts Wordwise to a European wordprocessor. Provides French, Italian, German, Scandinavian and Spanish characters grouped into five sets. For example.

French/Ital	German	Spanish
à ç é è ù ò ì	Ä Ö Ü ä ö ü ß	P.i Ñ ´c ñ ç

Additional accented characters are easily produced by overprinting a UK character with an accent as in ê. Euroword supports a range of printers including Epson type dot-matrix, Diablo 630 printwheels and the IBM extended character set.

"Wordwise-using modern language teachers should fall on Euroword gratefully" – Times Educational Supplement, 3 Feb 89.

Charm Micro Soft
10 Hall Lane,
Longton, Preston.
PR4 5XB. 0772-616705

Euroword is supplied on disc. A backup disc and 40 page manual are included. Price £14.90 inclusive. Please specify your printer and 40 or 80 track disc.

KOSMOS
S O F T W A R E

Whatever your subject

French, First Aid, Football, Spelling, Science, Spanish, Sport, Scotland, England, English Words, German, General Knowledge, Geography, Italian, Arithmetic, Natural History and Welsh

Let your computer help you learn

Write or phone for a FREE 20 page illustrated catalogue of our Leisure and Educational Software

KOSMOS SOFTWARE LIMITED
FREEPOST (no stamp needed)
DUNSTABLE, Beds. LU5 6BR
Tel 05255 3942 or 5406

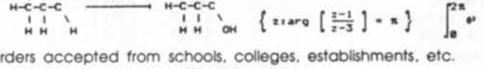
Sciways for Scientists

- Over 350 defined characters accessible with simple 2-key codes
- All characters printable on both screen and printer
- User defined characters can be stored on disc
- All facilities can be used with word processors or with BASIC
- Tested with BASIC I & II, Wordwise, Wordwise Plus, View 2.1, View 3.0, on the Master 128, B+ & Model B, and with Epson/compatible printers

GREEK ALPHABET: Upper and Lower case, upright and Italic

Α Β Γ Δ Ε Ζ Η Θ Ι Κ Λ Μ Ν Ξ Ο Π Ρ Σ Τ Υ Φ Χ Ψ Ω

SCIENTIFIC CHARACTERS: Mainly mathematical but also chemical symbols



Orders accepted from schools, colleges, establishments, etc.
Private orders – cheque with order, please

PRICE £39.95 inc VAT, p&p
16k ROM, 40/80 disc & manual
(not compatible with Inter-Word)

Mayhew Telonics,
376a Ringwood Road,
Poole, Dorset BH12 3LT
Tel: (0202) 747695

Reach For The Sky

with GLIDER PILOT 2, our comprehensive flight simulator. Features cable launch, thermals, cross country with map and practice option. Extensively machine coded for quick response. Instruction booklet.

With full instrumentation and "solid" colour perspective graphics, this is not a game but an accurate and challenging simulation. Keys or potentiometer joystick. Find the thermals and soar!!

FREE to disc users – "NOTEBOOK" – an easy to use memopad utility. Use it as a flight log for Glider Pilot 2!
B, B+ and MASTER.
Cassette £7.95, 5.25" Disc £8.95, 3.5" Disc £9.95.

APEX Software, Station Road, Penshaw, Tyne & Wear DH4 7PE. Tel: Durham 091-385 3091.

FontStyle' fonts

Increase your FontStyle' printing power!

FontStyle''s font range is now four discs –
Disc 1: Text fonts Disc 2: Display/Fancy
Disc 3: ancient & Modern Disc 4: **Thick** 'N' Thin
Each disc contains 15 fonts + 1 free font
Buy all 64 fonts at once and save £5!
5¼" DFS discs: 1 disc £4.95; 2 discs £8.45
3 discs £11.80; 4 discs £14.80
(State whether 40 or 80 track required)
3½" ADFS discs: add £1 per disc to above

All fonts compatible with Fontwise Plus
Ask for our free font catalogue

Send cheque with order to: CaperSoft,
36 DeBurgh Road, London SW19 1DU

***FAMILY HISTORY SYSTEM**
(Health Warning: Genealogy is Addictive)

****PAYROLL (Wages)**

**** ACCOUNT PLUS**

New **** TAXMAN**
End of Year Balance Sheet

Micro Trader £230, Micro Stock £86.25 plus other programs
(Prices: * £20.64) | (* * £58.13 inc VAT)

Micro Aid
Kildonan Courtyard, Barrhill, S. Ayrshire, KA26 0PS
Telephone: 0465-82288 and speak to Colin
Archimedes

MAKE YOUR MICRO EARN!

Yes making money becomes incidental when you know how. Your micro is, if only you knew it, a gold mine. The size and make is irrelevant. Make the initial effort. **NOW** by starting your own
HOME BASED BUSINESS.

This may be the most important move you will ever make!

REMEMBER: You'll never get rich by digging someone else's "ditch". Anyone in the country, including **YOU**, can become very rich in a relatively short period of time just by doing a few basic things! It's more rewarding than playing games. The benefits are many and varied. Full or part time. For **FREE** details send S.A.E. to:

HOME BASED BUSINESS
31 PILTON PLACE (MU5)
KING AND QUEEN STREET
WALWORTH, LONDON SE17 1DR

ROOM 7 SOFTWARE

INVESTMENT ANALYSER 2
NOW REDUCED TO
£19.55

POCKET ENGINEER
£34.50
THIS PROGRAM TO BE RELEASED IN MS-DOS

Fully bound software catalogue
50p P & P.
Refundable with order or Free with each Purchase

CENTRAL HEATING CALCULATOR
£23.00

INTRODUCTION TO STATISTICS
£7.95

ELECTRICAL CABLE SELECTOR
£17.25

Most of our programs are available for the Electron/B/B+/MASTER and COMPACT, 3.5" & 5.25" disc, and in DFS or ADFS.

Also covered by our catalogue - Soccer Boss, Pools cheque, Investment Analyser 2, Matrix, Central Heating calculator, Electrical cable selector, Structural Beam Calculator, Introduction to Statistics Easy Banker

Letters/cheques to: W.L. Computer Services, Dept. 4,
First floor, H.S.L. Building, 437 Warrington Road,
Rainhill, Merseyside L35 4LL. Tel 051-426 9660
VISA

contex

Archimedes is a trademark of Acorn Computers Ltd

BANK MANAGER *for disc systems only*
The most advanced and versatile personal bank account management program available for all BBC computers. Consistently acclaimed!
"data entry is a delight. . . professional. . . excellent product" –Micro User *April '86*
Enter cheques and receipts. Standing orders any frequency. Automatic date sequencing. Reconcile statements. Search, amend and delete. Unreconcile. Move forwards or backwards. Analyse expenditure. Forward cash flow forecast. Up to 36 simultaneous 'bank accounts' online, inter-account transfers, 9999 standing orders, 99 analysis categories. 12 actual and 12 budgets per category, over 4,000 postings on an 80tk disc. Reports to screen or printer. Graphics. Foreign currency support. Password. File recovery. Auto exec file. Field editing. Itemised look ahead. Programmable report writer.
Standard Bank Manager for the BBC B, B+ £17.50

BANK MANAGER MASTER *for disc systems only*
Includes all of the facilities of the Standard Bank Manager **plus** ADFS file system support, shadow screens, uses sideways RAM, 40 or 80 column screen reports. Improved graphics, m/c windows, function key support and onscreen labels, additional functions added to the already extensive report facilities.
Bank Manager Master for the MASTER and MASTER COMPACT £22.50

ARCHIMEDES BANK MANAGER
All facilities of Master version plus high speed 'native' mode, wild card analysis enquiry, analysis code sort and other enhancements.
"Impressed, ideal, easy to use."–Micro User, *March '88*
Archimedes Bank Manager £25.00

BANK MANAGER BUSINESS UTILITIES *for disc systems only*
For the 'professional' who also uses the BANK MANAGER to control the business accounts the BUSINESS UTILITIES add double entry trial balance and programmable spreadsheet analysis reports. Generated from cheque and cash transactions keyed into BANK MANAGER. Just pass the reports to your accountant! Available for all BANK MANAGER versions state which.
Bank Manager Business Utility Pack 1 £12.00

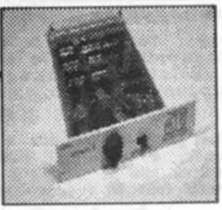
TYPING TUTOR
Quickly learn to touch type. Over 90 smoothly graded lessons graduate you from the basic home keys to complete keyboard mastery. Unique word scan line checking. Target WPM and percentage correct. Revise the targets or lessons as required. Audio key click for positive key depression. Establish a typing rhythm using the automatic metronone. Free format option. Disc version includes several enhancements e.g. on screen keyboard, exact mode, on screen parameters. Recommended.
Cassette £12.50, Disc for BBC B, B+, Master and Compact £12.50
Disc for Archimedes (all models) £15.00

ALL PRICES FULLY INCLUSIVE FREE POSTAGE WITHIN UK
Enquiries and Access Credit card orders telephone 0234-838347
Please state: cassette, 3.5" disc, 5.25" 40tk disc, or 5.25" 80tk disc and computer type (B. Compact, Master or Archimedes).

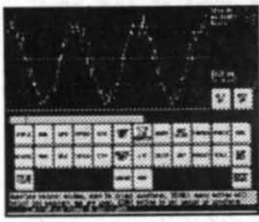
CONTEX COMPUTING

(REF. MU)
15 WOODLANDS CLOSE, COPLE, BEDFORD MK44 3UE

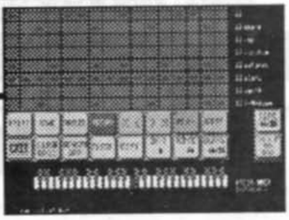
Now do something really amazing with your Archimedes...



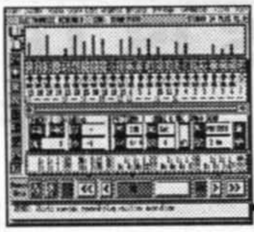
Sample a sound with SAMPLER 8



Edit a sound with SOUNDSYNTH



Play your sounds with RHYTHM BOX



or STUDIO 24 PLUS if you also want the ultimate Midi link

- and you'll be using a complete

EMR SoundStation!

Write or phone now to find out just how creative you and your Archimedes can be!

EMR LTD 14 Mount Close Wickford Essex SS11 8HG
Tel:0702 335747 Fax:0702 332370

ADVERTISER'S INDEX

4mation	72
A&G Electronics	56
Acorn User Show	85
Advisory Unit	77
Akom	58
Amcom	19
Ampsound	77
Apex Systems	136
Apricote Studios	138
B&S Computing	29
Beebug	6, 8, 12, 15
Brainsoft	68
Capersoft	137
Care Electronics	78
Charm Micro Soft	136
Circle Software	10
CJE Micros	30
Clares	48, 64
Computech	56
Computer Concepts	71, 118, 119
Computer Repairs	110
Contex Computing	137
Database Educational Software	52, 63
Dataplex	55
Datastore	72
Derbyshire Software	138
Doctor Soft	77
Econet	91
Electro Music Research	137
Fourth Dimension	116, 117
Home Based Business	138
HSV	88
Impact	139
Integrex	45
Keyzone Computer Products	110
Kosmos	136
Labelwise	126
Mach Technology	16, 17
Mandarin Software	86, 114
Maths Workshop	38
Mayhew Telonics	136
M D Office Supplies	26
Meadow Computers	108
Micro Aid	137
Microboss	126
MicroLink	18
Micromedia	91
Mijas	59
Minerva	3
M C Supplies	128
Morley Electronics	2
Paul Fray	108
Pineapple Software	88
Sabre Software	138
Selec Software	126
Silicon Vision	41, 46
Simtron	110
Software Bargains	23
Star Micronics	51
Superior Software	140
Technomatic	35
TK Computerware	56
Towerhill	54
Voltmace	66
Watford Electronics	92-105
Weserve	136
Wild Vision	58
W L Computers	138

MEGAPRINT-NLQ

PROFESSIONAL POSTERS FROM YOUR BBC MICRO

Ideal for use in the home, school and office, Megaprint-NLQ is an inexpensive, self-contained publishing package specifically designed for producing posters, notices and signs of any kind.

THIS AD WAS CREATED USING MEGAPRINT-NLQ!

The package includes a font editor for creating and editing fonts, a document editor on 16K ROM to design your notices and 12 complete fonts. Each of the 95 characters in every font is designed on an incredible 48 by 48 grid.

A Complete Package For Only £29.95 inc.

SEE REVIEW IN APRIL '89 MICRO USEP

"...the results are superb...well worth considering..." MICRONET 800

PLEASE WRITE FOR FURTHER DETAILS. EDUCATIONAL ORDERS WELCOME
MEGAPRINT-NLQ OPERATES ON THE BBC B/B+/MASTER WITH 5.25" DISK DRIVE(S) AND AN EPSON FX80 COMPATIBLE PRINTER. WHEN ORDERING PLEASE MAKE CHEQUES/P.O.s PAYABLE TO SABRE SOFTWARE AND STATE DISK FORMAT REQUIRED 40/80 TRACK · SINGLE/DOUBLE SIDED

SABRE SOFTWARE

Sabre Software
23 Sispara Gdns
London SW18 1LG

SABRE SOFTWARE

See for yourself the benefits of using *Money-Wise* Accounts

BBC B, B+, Compact, Master, Archimedes

NEW **DEMO DISK** NEW

What you Get:

- ★ A full evaluation of Money-Wise.
- ★ Instruction Book and Keystrip.
- ★ Welcome Disk (Inc. Extra Instructions & Sample Acc).
- ★ Useful Printer Utility worth £5.95
- ★ Software Voucher worth £5.95
- ★ ALL THIS FOR ONLY £5.95.(Please State Disk Format)

Money-Wise Accounts 16K rom (or image) £59.95
Includes full telephone Support. Phone for Details.
DERBYSHIRE SOFTWARE, 70 Lees Hall Avenue, Sheffield, S8 9JF Tel: (0742 557229)

'THIS IS THE BUSINESS'

THE ACCOUNT BOOK
The easiest to use accounting system for the BBC/Acorn range. How do we know? Simple, dozens of letters from satisfied customers. Unlimited entries, automatic date order, dozens of reports, full vat facilities.
Just £27.95. (see review in Beebug Vol. 7, No. 5)

And now: THE INVOICE PROGRAM
700 customer database. Very neat invoices with huge description space (max. approx. 2000 words!), Unpaid or Paid - database or one-offs - on continuous/single paper (for use with your own letterheads if you want - any size). Part/paid invoices. Automatic statements. Credit notes. User specified messages, credit terms, overdue messages, 100 stock description labels. Full vat facilities. Instant customer credit details, full linking with The Account Book and much, much more.
Amazing value at £27.95. You will not be disappointed.

Both the above programs can be used independently or linked together.
Special offer price for both £49.95

Order by phone, coupon or send for the fact sheets.

Please tick:
☐ 5.25" disc ☐ 3.5" disc ☐ ADFS ☐ DFS
☐ 80 track (minimum 1 double sided drive)
☐ 40 track (minimum 2 single drives)
☐ Account Book £27.95 ☐ Invoice Program £27.95 ☐ Both £49.95
Name: ....
Address: ....
....
Post Code: .... Telephone: ....
Access Card No. ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐ Signature ....
Please send order to Apricote Studios, 2 Purls Bridge Farm, Manea, Cambs, PE15 0ND or telephone 035 478 432 with your Access card number/enquiry.
All orders sent by return of post.

WHY PAY MORE AND GET LESS ?

FREE HELPSHEETS/MAPS

Spend over £4 on games and you may choose ONE of the following helpsheets/solutions and maps absolutely FREE.
Spend over £10 and you may choose any TWO FREE :-

Pipeline	(Helpsheet + 4 maps)
Village of Lost Souls	(Helpsheets)
Impact Jokes	(Lots of jokes)
Impact Jokes 2	(Lots more jokes)
Shark	(maps)
Spycat	(Solution + map)
Plan B	(Solution + map)
Zarch	(Helpsheet)
Stryker's Run	(Electron map)
Ziggy	(Solution + maps)
Future Shock	(Solution + map)
Airwolf	(Solution + map)
Return of R2	(Map + tips)
Bug Eyes 2	(Map)
Mycroft	(Solution)
The Lost Crystal	(Solution + maps)
Imogen	(Solution + 16 maps)
Quest	(Solution + map)
Ravenskull	(Solution + 4 maps)
Last of the Free	(Solution + map)
Stardrifter	(Helpsheet + map)
Corruption	(Solution)
Golden Figurine	(Solution + maps)
Enthar 7	(Solution)
Exile	(Helpsheet)
Terramex	(Solution)
The Hobbit	(Solution)
Citadel	(Solution + map)
Plan B2	(Solution + map)
Spy Vs Spy	(Helpsheet)
Spellbinder	(Solution + maps)
Elixir	(Solution + maps)
Paperboy	(Helpsheet)
Twin Kingdom Valley	(Solution + map)
Omega Orb	(Solution + map)
Elite	(Helpsheet + tips)
Tarzan	(Solution + map)
Stranded	(Solution)
Codename : Droid	(Solution + map)
Thunderstruck	(Solution + map)
Suds	(Solution)
Philosopher's Quest	(Solution + map)
Rick Hanson	(Solution)
Thrust	(Maps)
Last Ninja	(Solution + maps)
Hoverbod	(Passwords + cheats)
Frak!	(Helpsheet)
Thunderstruck 2	(Solution + map)
Kourtyard	(Helpsheet + map)
Dunjunz	(Helpsheet + 25 maps)
Gisburnes Castle	(Solution + map)
Palace of Magic	(Solution + map)
Impact	(Helpsheets + passwords)
Icarus	(Helpsheet + maps)
Sphinx Adventure	(Solution + map)
Anarchy Zone	(Helpsheet + passwords)
Repton 2	(Helpsheet + 18 maps)
Bonecruncher	(All passwords + maps)
Skirmish	(Helpsheet)
Cholo	(Solution)
Quest for Freedom	(Solution + map)
Kayleth	(Solution)
Starquake	(Helpsheet)
Rick Hanson 2	(Solution)
The Hunt	(Solution)
Sabre Wulf	(Helpsheet + map)
Exile	(Helpsheet - Part 2)

• ARCHIMEDES GAMES •

Holed Out (3D Golf)	
(The Fourth Dimension)	19.95
Cheat It Again, Archie	
(Impact Software)	11.95
Quazer (Impact Software)	11.95
Startrader (Gem)	16.95
Word Up & Word Down (Gem)	16.95
Pacmania (Grandslam)	15.95
Repton 3 (Superior)	15.45
Rise in Crime (Robico)	24.95
Jet Fighter (Minerva)	11.95
Corruption (Rainbird)	19.95
Fish (Rainbird)	19.95
Fireball (Godax)	15.95
Orion (Minerva)	11.95
Freddy's Folly (MInerva)	11.95
Alerion (Dabs Press)	12.95
Terramex (Grandslam)	15.95
Zarch (Superior)	15.45
Hoverbod (Minerva)	11.95
Missile Control (Minerva)	11.95
Thundermonk (Minerva)	11.95
Minotaur (Minerva)	11.95
3D Pool (Firebird)	16.95

TITLE & PUBLISHER	BBC or Electron Cassette	BBC 5 1/4" Disc	Master Compact 3 1/2" Disc
M = Master Compatible			
IMPACT SOFTWARE (Discs are BBC B & Master Compatible 40/80)			
Orbital M	4.95	5.95	6.95
Clogger M	4.95	4.99	6.95
Zenon M	4.95	4.99	6.95
Cheat It Again, Joe 1	2.99	4.99	-
Cheat It Again, Joe 2	2.99	4.99	-
Cheat It Again, Joe 3	2.99	4.99	-
THE FOURTH DIMENSION			
Holed Out (3D Golf) M	12.95	14.95	15.95
SUPERIOR			
Play It Again Sam 8 M	6.90	8.90	11.25
Play It Again Sam 7 M	6.90	8.90	11.25
Barbarian 2 M	6.90	8.90	11.25
Question of Sport M	9.50	11.50	15.70
Play It Again Sam 6 M	6.90	8.90	11.25
Last Ninja M	6.90	8.90	11.25
Repton Infinity M	9.45	11.45	15.75
Play It Again Sam 5 M	7.25	9.50	11.50
Exile M	9.45	11.45	15.75
By Fair Means or Foul M	6.90	8.90	11.25
Play it Again Sam 4 M	7.25	9.50	11.50
Play It Again Sam 3 M	6.90	8.90	11.25
Pipeline M	6.90	8.90	11.25
Repton Thru Time M	5.50	6.50	7.50
Barbarian M	6.90	8.90	11.25
Spycat M	6.90	8.90	11.25
Play it Again Sam 2 M	6.90	8.90	11.25
Bonecruncher M	6.90	8.90	11.25
Spellbinder M	7.25	9.50	8.95
Play it Again Sam M	6.90	8.90	11.25
The Life of Repton M	5.50	6.50	7.50
Elixir M	6.90	9.50	9.95
Palace of Magic M	6.90	8.90	11.25
Repton Around the World M	5.50	6.50	7.50
Crazee Rider M	6.90	8.90	11.25
Codename: Droid (Stryker's) M	6.90	8.90	11.25
Grand Prix Cons. Set M (BBC only)	7.25	9.50	8.95
Repton 3 M	6.90	8.90	11.25
Revs & 4 Tracks (BBC only) M	9.95	11.95	15.95
Elite M	9.45	11.45	15.75
Acornsoft Hits 1 M (BBC Only)	3.99	9.50	11.50
Acornsoft Hits 2 M	2.99	9.50	11.50
Sup. Coll. 1 or 2 (BBC only) M	7.25	9.50	11.50
Superior Coll. 3 (Elec Only)	7.25	-	-
Citadel M	2.99	8.90	11.25
Ravenskull M	2.99	8.90	11.25
Thrust M	2.99	8.90	11.25
Galaforce M	2.99	8.90	11.25
TYNESOFT			
Superman M	6.90	10.95	-
Circus Games M	6.90	10.95	-
Summer Olympiad M	6.90	11.25	11.25
Saigon M	7.25	-	-
Winter Olympiad '88 M	7.25	-	-
Spy vs Spy M	7.25	-	-
The Big K O M	6.50	10.50	10.50
Boulderdash M	-	-	9.95
Indoor Sports M	7.50	11.95	-
Commonwealth Games M	6.50	11.95	-
Future Shock M	7.50	11.95	11.95
GODAX			
Skirmish M	4.95	6.95	6.95
Kourtyard M	5.95	6.95	6.95

TITLE & PUBLISHER	BBC or Electron Cassette	BBC 5 1/4" Disc
M = Master Compatible		
A + F		
Chuckie Egg	3.99	-
ACORNSOFT		
Aviator (BBC Only)	3.99	-
Revs & Revs 4 Tracks (BBC B Only)	3.99	6.95
ASL		
Shark M	7.25	9.25
Breakthrough M	4.95	7.95
Impact M	7.25	9.50
Powerpack 2 (Elec Only)	5.95	-
Ziggy M	5.95	8.95
Ransack M	7.50	9.50
Thunderstruck	2.99	-
Thunderstruck 2	2.99	-
Sphere of Destiny M	5.95	9.50
Omega Orb M	-	5.95
Graham Gooch Test Cricket M	6.95	9.95
BEAU JOLLY		
Five Star Games 1 (5 games)	3.99	-
Five Star Games 2 (5 games)	3.99	-
Five Star Games 3 (7 games)	7.25	-
Computer Hits 2 (BBC Only) (10games)	3.99	7.95
Computer Hits 3 (10 games)	4.95	-
Computer Hits 4 (12 games)	7.25	-
Computer Hits 5 (5 games)	3.99	-
BUGBYTE		
Bugbyte Comp 1 (4 games) M	-	4.99
Bugbyte Comp 2 (4 games)	-	4.99
Dunjunz M	2.99	-
CDS		
Tank Attack M	9.95	11.95
Football Director M (BBC Only)	7.50	10.95
Colossus Bridge M	10.95	12.95
Colossus Chess M	7.50	12.95
Steve Davis Snooker M	1.99	4.99
Brian Clough Football M	5.95	7.95
CODA SOFTWARE (State 40 or 80 track)		
Headcoach M	-	15.95
DATABASE SOFTWARE		
Mini Office	4.95	-
Starquake (BBC Only) M	7.50	9.50
Mini Office 2 (BBC B Only)	12.95	14.95
Mini Office 2 (Master Disc)	-	15.95
Fun School 2 M:		
Under 6's M	7.50	9.95
6 to 8 Years M	7.50	9.95
Over 8's M	7.50	9.95
DOCTORSOFT		
Phantom Combat M	2.99	4.99
DOMARK		
Empire Strikes Back (BBC Only) M	6.90	9.70
Not a Penny More (BBC Only) M	6.95	6.95
Star Wars M	6.90	9.70
Trivial Pusuits (All BBC Only) :-		
Genius Edition M	12.50	15.95
Baby Boomer M	12.95	16.95
Bulls Eye (BBC Only)	7.50	-
Countdown (BBC Only)	7.50	-
Blockbusters (BBC Only)	7.50	10.95
EPIC SOFTWARE		
The Lost Crystal (BBC Only)	8.95	-

TITLE & PUBLISHER	BBC or Electron Cassette	BBC 5 1/4" Disc
M = Master Compatible		
ELK ADVENTURE CLUB		
The Axe of Kolt	4.95	-
Starship Quest	3.95	-
Magnetic Moon	3.95	-
FIREBIRD		
Sentinel (BBC Only) M	7.25	9.50
Cholo (BBC Only) M	-	15.95
3D Pool	7.95	9.95
GREMLIN GRAPHICS		
Krakout (BBC Only) M	6.95	9.95
IMAGINE		
Yie Ar Kung Fu 2 (Elec Only)	6.95	-
INCENTIVE		
Moon Cresta (BBC Only)	1.99	4.99
LOGOTRON		
Xor M	5.95	-
LOTHLORIAN		
Roundheads (BBC Only)M	-	9.95
MANDARIN		
Lancelot (80 Track Only BBC B with sideways/shadow RAM, B+, Master) M	-	12.95
Icarus M	7.50	9.95
Time and Magik (80 Track Only BBC B with sideways/shadow RAM, B+, Master) M	-	12.95
MARTECH		
Tarzan (BBC B Only)	-	4.99
War (BBC Only)	-	3.99
MASTER GAMES		
Scott Adams Scoops (BBC Only)	6.95	-
MICROPOWER		
Imogen M	7.25	9.50
Micropower Magic 1 (BBC Only)	4.95	-
Micropower Magic 2 (BBC Only)	4.95	-
Stockcar (BBC Only)	-	6.95
MIRRORSOFT		
Mastermind & Quizmaster	2.99	-
Tetris M	2.99	4.99
Spitfire '40 M	3.99	-
Strike Force Harrier	3.99	7.95
MOSAIC		
Yes Prime Minister (BBC Only)	8.95	-
TOPOLOGIKA		
(Text Adventures 5 1/4" state 40 or 80 tracks)		
Return to Doom M	-	10.95
Countdown to Doom M	-	9.50
U.S. GOLD		
Rebel Planet (BBC B Only)	4.95	-
Temple of Terror (BBC B Only)	4.95	-

BUDGET TITLES

BBC B or Electron Cassettes

ALL ONLY £1.99 EACH

Alien Dropout
Anarchy Zone
Bar Billiards
Blitzkrieg (Elec only)
Boxer (Elec only)
Chess (Elec only)
Creepy Cave
3D Dotty
3D Maze (Elec only)
Darts
Deathstar
Flight Path 737 (Elec only)
Frankenstein 2000
Gisburnes Castle
Golden Figurine
Golf
Graham Gooch Cricket (Elec only)
Grid Iron
Gunsmoke (Elec only)
Hyperdrive (Elec only)
Indoor Soccer (Elec only)
Invaders (Elec only)
Jetpac (BBC only)
Joe Blade 1
Joe Blade 2
Magic Mushrooms (BBC only)
Monkey Nuts
Moon Cresta (BBC only)
Mr Wiz
Nuts (BBC only)
Panic
Pegleg (Elec only)
Percy Penguin
Peter Scott Trilogy (BBC only)
Psycastria
Round Ones
Smash and Grab
Snapper (Elec only)
Snooker (BBC only)
Soccer Boss
Starship Command (Elec only)
Steve Davis Snooker
Stormcycle
Styx
Superpool (Elec only)
Swoop
Tempest
Thai Boxing (Elec Only)
Triple Deckers 1 - 10 (1.99 each)
UK PM (Elec only)
Vegas Jackpot
Video Card Arcade
Video Pinball
Wet Zone (Elec only)

ALL ONLY £2.99 EACH

Acornsoft Hits 2
Arcadians (Elec only)
Beachhead (BBC only)
Citadel
Commando
Cricket
Croaker
Drogna (BBC only)
Dunjunz
Felix in the Factory
Felix / Fruit Monsters (Elec only)
Football Manager
Footballer of the Year
Frenzy (Elec only)
Galaforce
Ghouls
Hopper (Elec only)
Hunkidory
Karate Combat
League Challenge
Megarock (BBC only)
Meteors (BBC only)
Mr Ee (BBC only)
Phantom Combat
Plan B
Plan B2
Pro Golf
Ravenskull
Repton
Repton 2
Roboto
Rocket Raid (BBC only)
Sphinx Adventure (Elec only)
Squeakaliser
Star Force Seven
Strykers Run
Survivors
Tennis
Thrust
Twin Kingdom Valley
Uranians
Warehouse

IMPACT NEWSLINE

For the very latest news ring: **0898 654334**
Off Peak Rate: 25p per minute / Peak Rate: 35p per minute
(If you are using your parents phone please ask for their permission first)

Simply fill in this coupon and send a cheque or postal order to Impact Software.

- All games despatched by 1st class post.
- **FREE** postage and packing (U.K.only).
- Despatch normally same day as order.
- Minimum orders £3.00.

TELEPHONE ORDERS WELCOME

VISA

IMPACT Software

Impact Software
Neepsend House
1 Percy St
Sheffield S3 8AU
Tel: (0742) 769950

To: Impact Software, Neepsend House, 1 Percy St, Sheffield, S3 8AU
Please send me the following :-

TITLE	FORMAT (Cassette etc.)	COMPUTER	PRICE
....	....	....	....
....	....	....	....
....	....	....	....
....	....	....	....
....	....	....	....
....	....	....	....

(We cannot accept orders for less than £3.00)
* **I enclose a cheque/P.O. or :** TOTAL COST....... £
* **Debit my Access/Visa card account :**

☐☐☐☐ ☐☐☐☐ ☐☐☐☐ ☐☐☐☐

(BLOCK CAPITALS PLEASE)

Name..

Address..

....

....

....

Postcode..

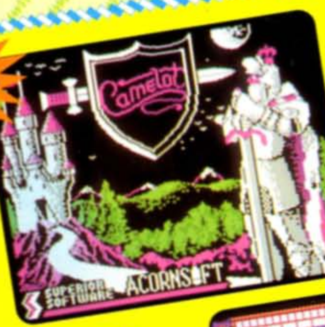
Please send me **FREE** helpsheets/solutions/maps for the following games (from those above)

1...(Orders over £4)

2...(Orders over £10)

PLAY IT AGAIN SAM 9

NEW RELEASE



CAMELOT

A New Release from Superior

Sixty action-packed screens... battling with fireballs against demons, witches and the Knights of the Round Table. Can you find Excalibur and defeat the fiery dragon? CAMELOT takes over where CITADEL and QUEST left off.

SUPERIOR APPROVED

Steve Davis
SNOOKER

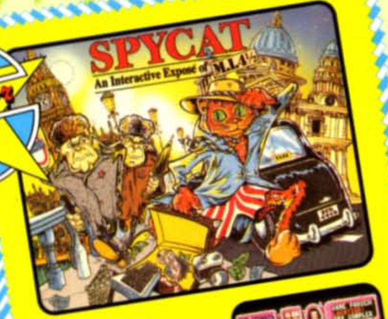
STEVE DAVIS SNOOKER

The No. 1 Hit from CDS

Play a friend or Steve Davis (i.e. your computer). Choose direction, speed, spin and power, then watch the balls slip in the pockets.

"There have been snooker simulations before... but this is the best." ...A & B Computing

A Superior Hit


SPYCAT
An Interactive Exposé of M.I.A

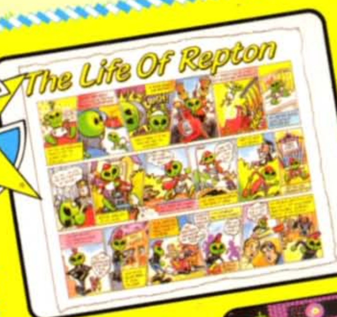
SPYCAT

The Spycatching Smash Hit

All the thrills and intrigue of the world of espionage... which even "the book" couldn't reveal!

"One hundred screens of fiendish puzzles and unusual adversaries...Spycat is a very amusing game." ...Acorn User

A Superior Hit



THE LIFE OF REPTON

Superior's No. 1 Hit

Repton returns to star in 40 screens depicting his life-story, from baby to old-age pensioner. Also includes screen and character editors.

"A super game which will keep you busy for days - probably weeks." ...Micro User

PLAY IT AGAIN SAM 9 for the BBC Micro and Acorn Electron

Superior has combined a top-quality brand-new release with three recent smash hits. The result is an action-packed four game compilation that combines variety with great value for money. Don't miss it for your collection!

BBC Micro Cassette	£9.95	Acorn Electron Cassette	£9.95
BBC Micro 5¼" Disc	£11.95	BBC Master Compact 3½" Disc	£14.95

(Compatible with the BBC B, B+ and Master Series computers)

Please make cheques payable to "Superior Software Ltd".

(The screen pictures show the BBC Micro versions of the games.)

HAVE YOU GOT THE COMPLETE COLLECTION?

All these previous PLAY IT AGAIN SAM four-game compilations are still available from your local dealer or direct by mail order from Superior Software. Prices are the same as for Play It Again Sam 9.

PLAY IT AGAIN SAM 1 - Citadel, Thrust, Stryker's Run, Ravenskull
PLAY IT AGAIN SAM 2 - Repton 3, Crazee Rider, Galaforce, Codename: Droid
PLAY IT AGAIN SAM 3 - Commando, Palace of Magic, Killer Gorilla, Killer Gorilla 2
PLAY IT AGAIN SAM 4 - Frak!, Spellbinder, Cosmic Camouflage, Grand Prix Construction Set (BBC Micro only), Guardian (Electron only)
PLAY IT AGAIN SAM 5 - Imogen, Elixir, Bug Blaster, Fortress (BBC Micro only), Moonraider (Electron only)
PLAY IT AGAIN SAM 6 - Galaforce 2, Hunchback, Hopper, The Sentinel (BBC Micro only), Video's Revenge (Electron only)
PLAY IT AGAIN SAM 7 - Firetrack, Bonecruncher, Snapper, Ghouls
PLAY IT AGAIN SAM 8 - Winter Olympiad 88, Quest, Around the World in 40 Screens, Mr. Wiz

SUPERIOR SOFTWARE Limited
ACORNSOFT

(Acornsoft is a registered trademark of Acorn Computers Ltd. Superior Software Ltd is a registered user.)

Dept 9PS1, Regent House, Skinner Lane, Leeds LS7 1AX. Telephone:(0532) 459453

Available from WHSMITH and all major dealers

ACCESS VISA

24 HOUR TELEPHONE ANSWERING SERVICE FOR ORDERS

OUR GUARANTEE

- All mail orders are despatched within 24 hours by first-class post.
- Postage and packing is free.
- Faulty cassettes and discs will be replaced immediately. (This does not affect your statutory rights)